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PHYSICAL CONSTANTS OF HYDROCARBONS

Volume III
MONONUCLEAR AROMATIC HYDROCARBONS

GUSTAV EGLOFF

DIRECTOR OF RESEARCH
UNIVERSAL OIL PRODUCTS COMPANY
RESEARCH LABORATORIES
CHICAGO, ILLINOIS

American Chemical Society
Monograph Series

REINHOLD PUBLISHING CORPORATION
330 WEST FORTY-SECOND STREET, NEW YORK, U. S. A.

1946

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Dedicated to

JOSEPH G. ALTHER

GENERAL INTRODUCTION

American Chemical Society Series of Chemical Monographs

By arrangement with the Interallied Conference of Pure and Applied Chemistry, which met in London and Brussels in July, 1919, the American Chemical Society was to undertake the production and publication of Scientific and Technologic monographs on chemical subjects. At the same time it was agreed that the National Research Council, in cooperation with the American Chemical Society and the American Physical Society, should undertake the production and publication of Critical Tables of Chemical and Physical Constants. The American Chemical Society and the National Research Council mutually agreed to care for these two fields of chemical development. The American Chemical Society named as Trustees, to make the necessary arrangements for the publication of the monographs, Charles L. Parsons, secretary of the Society, Washington, D. C.; the late John E. Teeple, then treasurer of the Society, New York; and Professor Gellert Alleman of Swarthmore College. The Trustees arranged for the publication of the A.C.S. series of (a) Scientific and (b) Technologic Monographs by the Chemical Catalog Company, Inc. (Reinhold Publishing Corporation, successors) of New York.

The Council of the American Chemical Society, acting through its Committee on National Policy, appointed editors (the present list of whom appears at the close of this introduction) to select authors of competent authority in their respective fields and to consider critically the manuscripts submitted.

The first monograph of the series appeared in 1921. After twenty-three years of experience certain modifications of general policy are indicated. In the beginning there still remained from the preceding five decades a distinct though arbitrary differentiation between so-called "pure science" publications and technologic or applied science literature. This differentiation is fast becoming nebulous. Research in private enterprise has grown apace and not a little of it is pursued on the frontiers of knowledge. Furthermore, most workers in the sciences are coming to see the artificiality of the separation. The methods of both groups of workers are the same. They employ the same instrumentalities, and now frankly recognize that their objectives are common, namely the search for new knowledge for the service of man. The officers of the

Society therefore have combined the two editorial Boards in a single Board of twelve representative members.

Also in the beginning of the series, it seemed expedient to construe rather broadly the definition of a monograph. Needs of workers had to be recognized. Consequently among the first one hundred monographs appeared works in the form of treatises covering in some instances rather broad areas. Because such necessary works do not now want for publishers, it is considered advisable to hew more strictly to the line of the monograph character which means more complete and critical treatment of relatively restricted areas, and where a broader field needs coverage, to subdivide it into logical sub-areas. The prodigious expansion of new knowledge makes such a change desirable.

These monographs are intended to serve two principal purposes: first, to make available to chemists a thorough treatment of a selected area in form usable by persons working in more or less unrelated fields to the end that they may correlate their own work with a larger area of physical science discipline; second, to stimulate further research in the specific field treated. To implement this purpose the authors of monographs are expected to give extended references to the literature. Where the literature is of such volume that a complete bibliography is impracticable, the authors are expected to append a list of references critically selected on the basis of their relative importance and significance.

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Preface

The abundance of mononuclear aromatic hydrocarbons found in the world's resources, such as coal tar and petroleum, calls for a complete study of their physical constants. The present study is a collation of all melting point, boiling point, density, and refractive index data available before May, 1944. War-time restrictions have prevented the incorporation of some valuable data determined under the auspices of the American Petroleum Institute at the National Bureau of Standards.

We are indeed grateful to the staff of John Crerar Library for valuable guidance in the location of material and for privileges granted in connection with use of the outstanding facilities of this institution.

Deep appreciation is hereby expressed for the assistance of the Universal Oil Products Company and the author's colleagues, Mary Alexander, Prudence Van Arsdell, Nancy Corbin, Madge Spiegler, and M. S. Beyt in this collation and critical study of the physical constants of aromatic hydrocarbons.

GUSTAV EGLOFF

Chicago, Ill.,
May 1, 1945

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I. INTRODUCTION

Foreword

The present volume of Physical Constants of Hydrocarbons, the third of the series, is a collation and evaluation of physical constants of mononuclear aromatic hydrocarbons. This classification excludes hydrocarbons having a fused ring structure, any ring of which is aromatic. *Biphenyl* and *bicycloheptylbenzene* appear in this volume, but polynuclear aromatics such as *indane* and *tetralin* will appear in Volume IV. The constants of aliphatic and alicyclic hydrocarbons were published in Volumes I and II respectively.

The values tabulated in this volume were collected from the literature and unpublished data from Universal Oil Products Company and other research laboratories. The method used for searching is given here to indicate the degree of completeness of the study. References on hydrocarbons were located by a check of the subject and formula indexes of *Chemical Abstracts* from its beginning through 1943 and the subject and formula indexes of *Chemisches Zentralblatt* from 1900 through 1939. The check on these journals was brought up to date through a page by page perusal of *Chemical Abstracts* from January to May 1944 and the issues of *Chemisches Zentralblatt* that have been available since 1940. Beilstein's "Handbuch der Organische Chemie," Volumes V and Supplement V, were covered to find references published before 1900 and to insure thorough coverage of the later literature. The Landolt-Börnstein "Tabellen," which contain references on physical chemistry, were also checked because of the specific nature of the contents. Other secondary sources were covered in part, but sufficient additional material was not found to warrant complete coverage. Some references came to our attention while studying the current chemical literature. The original publications of the references thus located were then covered with the exception of a few which were unavailable or printed in languages other than English, French, German, Italian, Russian, and Spanish. From the bibliographies of the original publications covered, many additional references were found. The research involved a total of about 20,000 references of which approximately 5,500 contained data suitable for this volume and Volume IV.

The constants recorded were melting points at all given pressures, boiling points at all pressures, densities at all temperatures, refractive indices of the sodium D, hydrogen α, β, and γ, and helium lines at all temperatures, angles of rotation at the sodium D lines at all temperatures, critical temperatures, critical pressures, critical densities, and sublimation points. Melting ranges over two degrees were not recorded except in unusual cases. Pentarylethanes, for example, decompose on melting in

air and consequently give wide melting point ranges. These ranges were recorded as well as wide ranges for compounds on which no other data were available. Boiling point ranges over five degrees were omitted and smaller ranges were eliminated when considerable data were available for a compound.

All figures were recorded as given when the original was read, but during the final editing all units of temperature were converted to degrees centigrade. For the conversion of Absolute or Kelvin temperatures, 273°, 273.2°, or 273.16° was subtracted, according to the number of significant figures of the original reading. All units of pressure were converted to millimeters of mercury except melting point pressures, which were converted to atmospheres. Values from obviously careless determinations were not recorded. At the time they were abstracted, all values were given a rating on a scale on which one unit represented the poorest work and five the best. In cases where considerable data were available, the poorer values were eliminated from the tabulation. For example, benzene values were abstracted from over one thousand references but it was thought worthwhile to record the constants from only the best four hundred of these. Despite our efforts to make the search complete and accurate we have probably omitted some data and erred in some of the tabulations. We should appreciate having any omissions or errors called to our attention.

History of Benzene

Benzene, the parent mononuclear aromatic hydrocarbon, was discovered by Michael Faraday in 1825.[1] Although liquids of which benzene was doubtless the principal constituent were described in earlier records, Faraday was the first to isolate benzene and determine its physical and chemical properties.[2] The source from which he obtained it was the oil-gas used for illuminating purposes. He named the compound "bicarburet of hydrogen," but Mitscherlich, who prepared the same compound by the distillation of benzoic acid with lime, chose to call it "benzin".[3] This name, with variations in spelling, has been used since that time. Mitscherlich identified his compound with that of Faraday on the basis of corresponding physical and chemical properties, and in addition determined its empirical formula.

Table 1.

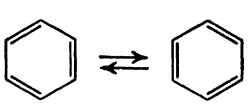
	Faraday (1825)	Mitscherlich (1833)	Calculated Values[4] (1945)
M. P.	5.6°	7°	5.49°
B. P.	85.6°	86°	80.07°
D (liquid)	0.85@15.5°	0.85	0.88343@15.5°
D (solid)	0.956		1.00643@ 5.5°

1. Faraday, M., Phil. Trans. 1825, 440.
2. Lunge, G., "Coal-Tar and Ammonia," 4th ed., Gurney and Jackson, London, 1909, p. 1148.
3. Mitscherlich, E., Ann. Physik 29, 231 1833.
4. These values were calculated from the equations derived for the present volume of "Physical Constants of Hydrocarbons."

In 1845, Hofmann reported the presence of benzene in coal tar,[5] but prior discovery was claimed by Leigh, who contended that his report of 1842 had not received proper publication.[6,7] This discovery was highly important in that it revealed a source of benzene and other aromatics sufficiently large to meet the commercial demands soon created by Perkin's discovery of mauve in 1856. Another potentially large commercial source was first made known by De La Rue and Müller's discovery of benzene in "Burmese naphtha" or "Rangoon tar" which is known today as petroleum.[8] Coal gas, a source of benzene widely used in the early days of the aromatic industry, was suggested as a source by Faraday, but Berthelot's publications in 1876 were the first to report experimental evidence of the presence of benzene in coal gas.[9]

Although the problem of the structure of benzene and its derivatives has confronted chemists since the compound was known, some features of aromatic behavior have been clarified only since the concept of resonance was set forth. The classical conception of double bonds involves a type of reactivity consistent with their use in aliphatic and alicyclic structures but inconsistent with aromatic behavior. Kekulé's proposal proved for a long time to be the most adequate conception of the structure of benzene and has laid the groundwork for the present theoretical concept.[10] The original formula, a conjugated cyclohexatriene, immediately raised objections, for only one *ortho* disubstitution product was known, whereas two were possible from Kekulé's structure.

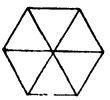
Furthermore, the high degree of unsaturation would result in greater reactivity than was observed with benzene. Kekulé then modified his original theory by proposing a system of oscillating double bonds as represented by the following diagram.[11]



Although this theory has been modified in the light of resonance, the above forms are accepted as two resonance structures.

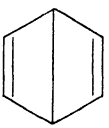
5. Hofmann, A. W., Ann. **55**, 200 1845.
6. Leigh, Brit. Assoc. Advancement Sci., Rept. **12**, sec. 2, 39 1842.
7. Lunge, G., "Coal-Tar and Ammonia," 4th ed., Gurney and Jackson, London, 1909, p. 177.
8. De La Rue, W., and H. Müller, Proc. Roy. Soc. **8**, 221 1856.
9. Berthelot, Compt. rend. **82**, 871 1876.
10. Kekulé, A., Bull. soc. chim. [2] **3**, 98 1863.
11. Kekulé, A., Ann. **162**, 77 1872.

Other structures, proposed by Kekulé's contemporaries, sufficiently plausible to receive some consideration were those of Claus, Dewar, Ladenberg, Armstrong, Baeyer, and Thiele. Claus's formula in which all carbon atoms have one *para* bond is ruled out because such a structure represents a compound with considerable tendency to react.



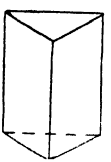
(Claus 1867)

For the same reason, Dewar's formula is highly improbable.[12]



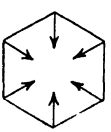
(Dewar 1866)

This symbol has been used, however, to represent one of the less stable resonance structures.[13] Ladenburg's prismatic formula[14] is not possible, since it has been established that the benzene ring lies in one plane.



(Ladenburg 1869)

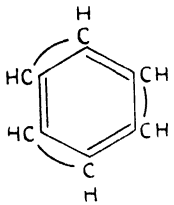
The Armstrong-Baeyer centric formula[15] is meaningless unless the bonds pointing toward the center are interpreted as free valences. Such a condition would result in a compound having a greater tendency to react than is exhibited by benzene.



(Armstrong-Baeyer 1887)

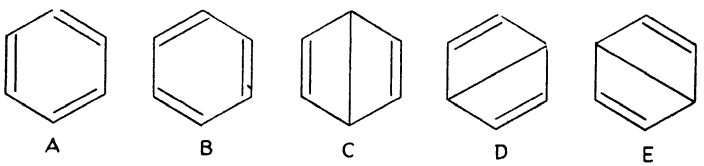
Thiele's partial valence theory[16] is also vague in that the curved lines have no significance in our concept of valences.

12. Dewar, Proc. Roy. Soc. Edinburgh 1866-7, 82.
13. Pauling, L., and G. W. Wheland, J. Chem. Phys. 3, 362 1933.
14. Ladenburg, A., Ber. 2, 140 1869.
15. Armstrong, H. E., J. Chem. Soc. 51, 258 1887; A. Baeyer, Ann. 245, 103 1888; *ibid.* 251, 257 1899.
16. Thiele, J., Ann. 506, 87 1899.



(Thiele 1899)

The concept of the benzene molecule set forth by the theory of resonance is a structure which may be represented essentially by the following symbols:[17]



Resonance among these structures imparts to benzene its characteristics which are peculiar to aromatic compounds. The resonance energy resulting from the resonance between these structures causes the molecule to be more stable than if it existed in any one of the resonance structures alone. The molecule does not behave as if its structure shifted from one of these symbols to another. Its behavior coincides with one permanent structure functioning as a composite of the various resonance structures. The Kekulé structures, A and B, are far more important than the others, for the resonance energy between them is about 80 per cent of the total. The excited structures C, D, and E, which are much less stable than A and B, contribute about 20 per cent of the resonance energy. For a detailed discussion of this subject, the reader is referred to Wheland.[18]

The inadequacy of any single formula for benzene has prompted many chemists to adopt the symbol

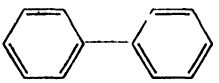
In the tables of this book we have arbitrarily used the structure

for benzene to avoid confusion with six-carbon alicyclic structures.

17. Pauling, L., and G. W. Wheland, J. Chem. Phys. 1, 362 1933.
18. Wheland, G. W., "Theory of Resonance," John Wiley and Sons, Inc., New York, 1944.

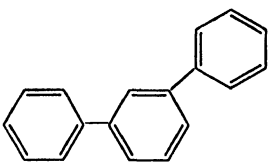
Organization of Compounds

The organization of this volume will be reviewed to facilitate the location of information and to explain the significance of data given in the tables. The titles and corresponding initial pages of all general classifications and sections are found in the Table of Contents. The general classifications are arranged in order with increasing number of benzene rings, *i.e.*, all compounds containing only one benzene ring, are tabulated before *biphenyl*,

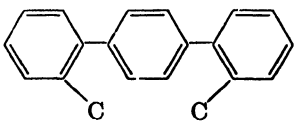


all compounds with two benzene rings before *terphenyl*, etc.

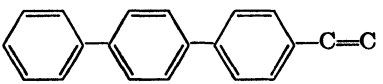
Compounds of more than ten phenyl groups are listed under the general classification, Higher Phenyl Compounds. These general classifications are further limited by the general nature of substituents, *i.e.*, benzene with aliphatic substituents precedes benzene with alicyclic substituents. Classifications of compounds having two or more benzene rings are so made that compounds with phenyl-phenyl linkages are listed separately and precede compounds with two or more phenyl substitutions on aliphatics or alicyclics. For example, classifications including (A), (B), and (C)



1,3-Diphenylbenzene
(A)

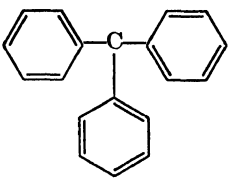


1,4-Di-*o*-tolylbenzene
(B)

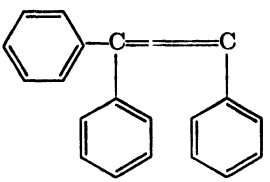


1-Phenyl-4-(4′-ethenylphenyl)-benzene
(C)

precede those including (D) and (E).

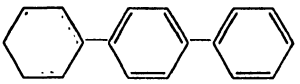


Triphenylmethane
(D)

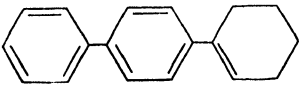


1,1,2-Triphenylethene
(E)

Classifications including compounds such as (F) and (G)

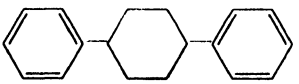


1-Cyclohexyl-4-phenylbenzene
(F)

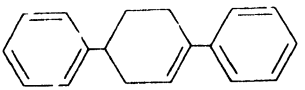


1-(Cyclohexen-1′-yl)-4-phenylbenzene
(G)

precede those including (H) and (I).



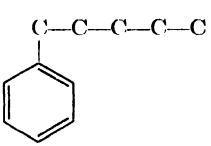
1,4-Diphenylcyclohexane
(H)



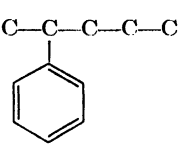
1,4-Diphenylcyclohexene-1
(I)

The sections numbered with arabic numerals under a given classification are listed in order of decreasing hydrogen content of the compounds. If the hydrogen content of the compounds in two or more sections is equal, the sections for aliphatic substituents are listed primarily in order of increasing number of unsaturated linkages, *i.e.*, Alkynylbenzenes (C_nH_{2n-10}), Alkadienylbenzenes (C_nH_{2n-10}), Dialkenylbenzenes (C_nH_{2n-10}); the sections for alicyclic compounds are listed primarily in order of increasing number of alicyclic substituents, secondly in order of increasing complexity within the substituent, *i.e.*, Cyclenylbenzenes (C_nH_{2n-10}), Bicyclylbenzenes (C_nH_{2n-10}), Dicyclylbenzenes (C_nH_{2n-10}).

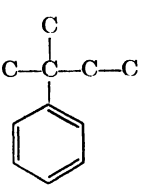
Within each section, the compounds are tabulated primarily in order of increasing carbon content. The order used for compounds having a given carbon content was assigned in accordance with increasing number and complexity of substituents, *e.g.*:



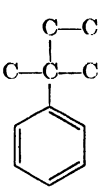
(1) *n*-Pentylbenzene



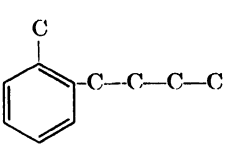
(2) 2-Phenylpentane



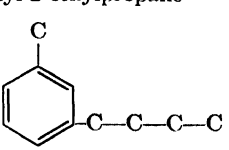
(3) 2-Phenyl-2-methylbutane



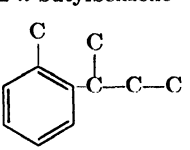
(4) 2-Phenyl-2-ethylpropane



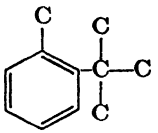
(5) 1-Methyl-2-*n*-butylbenzene



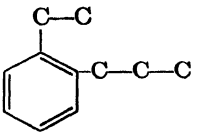
(6) 1-Methyl-3-*n*-butylbenzene



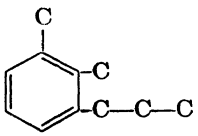
(7) 1-Methyl-2-*sec*-butylbenzene



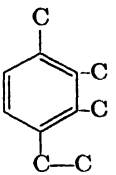
(8) 1-Methyl-2-*tert*-butylbenzene



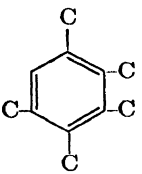
(9) 1-Ethyl-2-*n*-propylbenzene



(10) 1,2-Dimethyl-3-*n*-propylbenzene

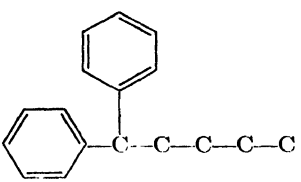


(11) 1,2,3-Trimethyl-4-ethylbenzen

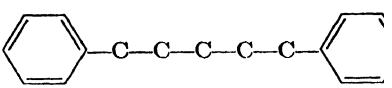


(12) Pentamethylbenzene

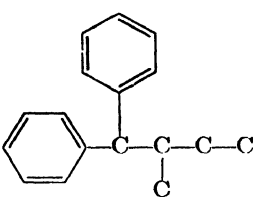
The compounds having two phenyl groups substituted on aliphatics fol in the order:



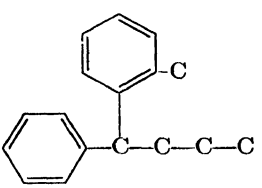
(1) 1,1-Diphenylpentane



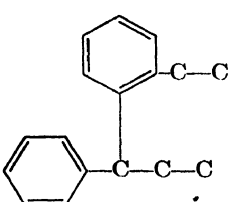
(2) 1,5-Diphenylpentane



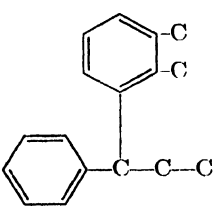
(3) 1,1-Diphenyl-2-methylbutane



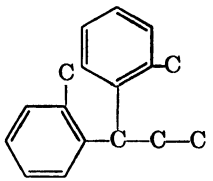
(4) 1-Phenyl-1-*o*-tolylbutane



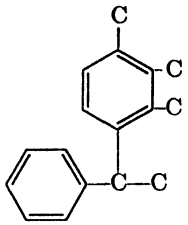
(5) 1-Phenyl-1-(2′-ethylphenyl)-propane



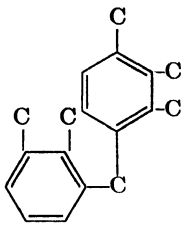
(6) 1-Phenyl-1-(2′,3′-dimethylpheny propane



(7) 1,1-Di-*o*-tolylpropane



(8) 1-Phenyl-1-(2′,3′,4′-trimethylphenyl)-ethane



(9) 2,3-Dimethylphenyl-(2′,3′,4′-trimethylphenyl)-methane

The page number of each group of references is listed in the table of contents. References are found at the end of each section except for those having a large number of references. In these cases, the references will be found immediately following the constants of a single compound or the compounds of a given carbon content. The references include the author's name and initials as stated in the original publication, the standard abbreviation for the periodical, the volume number, first page of the article, and year of publication. References to secondary sources also are given for those articles not read in original form. All Russian names have been transliterated in accordance with *Chemical Abstracts*' practice to standardize spelling and to avoid the duplication of references. For example, the Russian name transliterated to Wolnow in the German literature is recorded in this study as Volnov.

Nomenclature

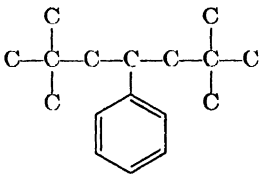
In the absence of a system of nomenclature covering all types of mononuclear aromatics, the compounds in this book have been assigned scientific names compounded from the Geneva rules[19] and Proposed International Rules[20] for numbering ring systems. The deviations which were made in the interests of simplifying some of the nomenclature will be explained. Each compound has primarily been given a name which should not be ambiguous. Secondly, an attempt was made to regard the benzene ring as nuclear, but this practice was not followed when it involved the use of unnecessarily complicated nomenclature. The names used are strictly in accordance with scientific practice except for compounds which have a

19. Patterson, A. M., J. Am. Chem. Soc. **55**, 3905 1933.
20. Patterson, A. M., and L. T. Capell, "The Ring Index," Reinhold Publishing Corp., New York, 1940.

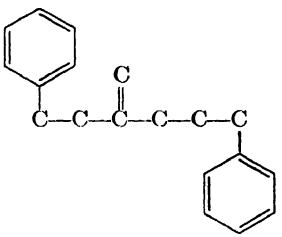
classic trivial name that has been used almost exclusively in the literature. Compounds with a trivial name well known to workers in a specific field but not to chemists in general are given the scientific names with common names and alternative scientific names in parentheses beneath the preferred name. An example of this type is Isopropylbenzene (Cumene).

Illustrations of preferred and alternative scientific nomenclature follow. The name 1,4-Di-*n*-propylbenzene is used in preference to 1-(4′-*n*-Propylphenyl)-propane, but 1-Phenyl-2-methylbutane is preferred to (2′-Methylbutyl)-benzene. Other examples include the use of 1-Phenyl-2,4-dimethylcyclohexane rather than (2′,4′-Dimethylcyclohexyl)-benzene and the use of 4,4′-Diethylbiphenyl in preference to 1-Ethyl-4-(4′-ethylphenyl)-benzene.

When names were assigned with reference to aliphatic muclei, the longest straight chain was named as the nuclear hydrocarbon. For example, the compound below is named 2,2,6,6-Tetramethyl-4-phenylheptane rather than 1,3-Di-*tert*-butyl-2-phenylpropane.

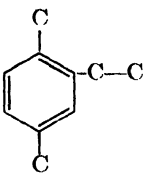


This practice was also followed for compounds having unsaturated substituents, *i.e.*, 1,6-Diphenyl-3-methylenehexane was used in preference to 2-Phenethyl-5-phenylpentene-1.



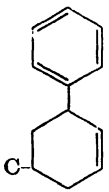
Except for bicyclyl and tricyclyl derivatives, such as 2-Phenylbicyclo-[2,2,0]-hexane and 3-Phenyltricyclo-[2,2,1,$0^{2,5}$]-heptane, numbers were assigned to substituents according to the following specifications:

(1) The sum of numbers assigned to the substituents and unsaturated linkages was the lowest possible numerical value.



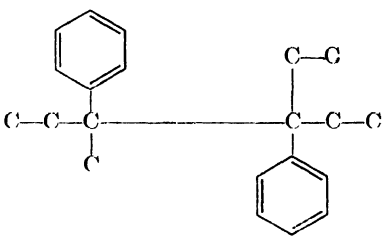
1,4-Dimethyl-2-ethylbenzene, *not* 1,4-Dimethyl-3-ethylbenzene.

(2) After the condition under (1) was satisfied, the lowest number was given first to double bonds, and second to triple bonds.

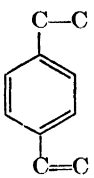


1-Phenyl-5-methylcyclohexene-2, *not* 1-Methyl-3-phenylcyclohexene-4.

(3) After fulfilling the conditions under (1) and (2), the lowest number was assigned primarily to the group having the least carbon atoms (for alicyclic groups, the ring having the fewest carbon atoms), and secondly to the most saturated substituent. This order follows: methyl, ethyl, ethynyl, propyl, isopropyl, etc., hexyl, methylcyclopentyl, cyclohexyl, cyclohexenyl, cyclohexadienyl, phenyl, etc.

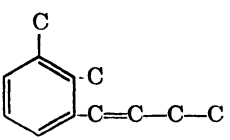


3-Methyl-3,4-diphenyl-4-ethylhexane, *not* 3-Ethyl-3,4-diphenyl-4-methylhexane



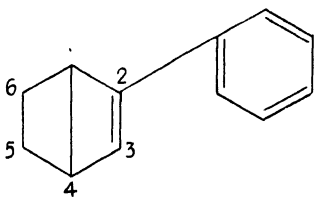
1-Ethyl-4-ethenylbenzene, *not* 1-Ethenyl-4-ethylbenzene

The position of the benzene ring relative to its substituent was assumed to be the 1-position of the substituent unless otherwise specified. This practice was observed to simplify the nomenclature so that a compound could be named 1,2-Dimethyl-3-(buten-1′-yl)-benzene rather than 1,2-Dimethyl-3-[1′-(buten-1′-yl)]-benzene.



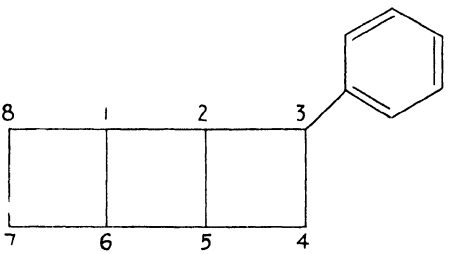
The Proposed International Rules for numbering ring systems were followed in the nomenclature of bicyclo and tricyclo derivatives. A

thorough discussion of these rules is found in the Introduction to Volume II of the "Physical Constants of Hydrocarbons." The previously discussed methods of assigning substituent numbers were adhered to only after the conditions set forth in the International Rules were satisfied. The alicyclic structure was named as the parent hydrocarbon unless a simpler and less ambiguous name resulted from considering the alicyclic as a substituent. Examples of the nomenclature used for these classes of compounds follow:



2-Phenylbicyclo-[2,2,0]-hexene-2

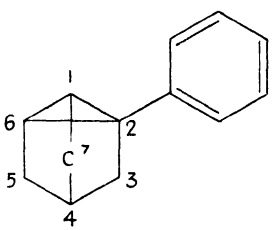
The double bond and phenyl groups cannot be assigned the lowest number when the system for numbering bicyclic compounds is followed.



3-Phenyltricyclo-[4,2,0,$0^{2,5}$]-octane

not

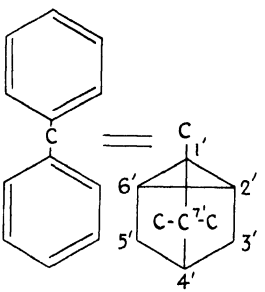
2-Phenyltricyclo-[2,4,$0^{5,8}$,0]-octane



2-Phenyltricyclo-[2,2,1,$0^{2,6}$]-heptane

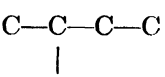
not

1-Phenyltricyclo-[$3^{1,5}$,1,1]-heptane

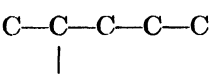


1,1-Diphenyl-2-(7′,7′-dimethyltricyclo-[2,2,1,$0^{2,6}$]-heptanyl)-ethene

The prefixes *sec* and *iso*, which are commonly used in the literature to differentiate between aliphatic isomers, were not used in this volume unless their use markedly simplifies the nomenclature. Secondary (*sec*) was used only to refer to 2-Phenylaliphatics.

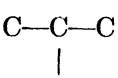


sec-Butyl

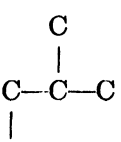


sec-Pentyl

Iso was used only in connection with propyl and butyl radicals.

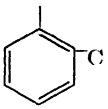


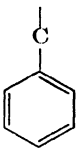
Isopropyl

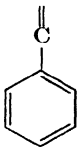


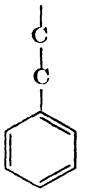
Isobutyl

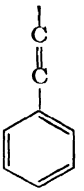
Radicals containing, for example, both an alicyclic and an alkyl group or both a phenyl and an alkenyl group were named as complex radicals. Complex names used were *o*-, *m*-, and *p*-tolyl, benzyl, benzylidene, phenethyl, phenethenyl, phenethylidene, phenethynyl, *o*-, *m*-, and *p*-biphenylyl, benzhydryl, and benzhydrylidene.

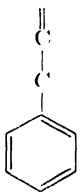

o-Tolyl

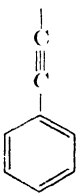

Benzyl

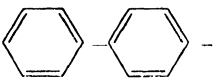

Benzylidene

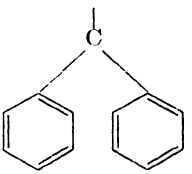

Phenethyl

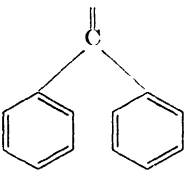

Phenethenyl


Phenethylidene

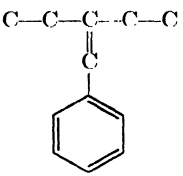

Phenethynyl

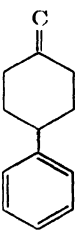

p-Biphenylyl


Benzhydryl

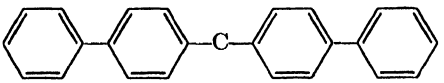

Benzhydrylidene

A group linked to a second group by a double bond was sometimes named as the substituent of the second group; the suffix, -ylidene, was used for these substituents except in the case of a one carbon group which is called methylene.

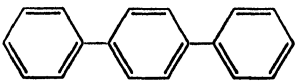

3-Benzylidenepentane


1-Methylene-4-phenylcyclohexane

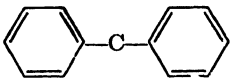
The Greek (di, tri, tetra, etc.) prefixes were used to denote the number of substituents of a given kind and the Latin (bi, ter, quatra, etc.) to indicate the number of units of a given kind in a radical or nucleus.



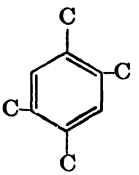
Di-*p*-biphenylylmethane



p-Terphenyl



Diphenylmethane



1,2,4,5-Tetramethylbenzene

Critical Evaluation of the Data and Calculation of the Most Probable Values

Precision and Accuracy of the Data

Critical evaluation of the experimental data on physical constants is limited by the failure of many investigators to report the extent to which their compounds were purified, the precision of apparatus used and other bases for comparison of data. Each value was given an accuracy rating from 1 to 5 (5 signifies the best) based on the reliability of the experimenter and information given in the article such as carbon and hydrogen analyses, methods of purification, description of apparatus, and date of the investigation. Another important factor in evaluating a constant is the purpose for which it was determined. Data determined for the purpose of finding the actual numerical value of the constant are in general the best available. Constants from experiments in physical chemistry, which necessitate meticulous work, usually are superior to values given when the object of the experiment is the preparation of a compound. A constant reported as a criterion of purity or for identification of a by-product of the main reaction is seldom very accurate.

A precision rating based on the probable error of the determination was also assigned. When the probable error was not given, the usual custom of arbitrarily assuming it to be ± 2 in the last figure was followed. The precision ratings are inversely proportional to the squares of the probable errors. The total weight of the value for the physical constant is the product of the accuracy rating and the precision rating, as shown in the following example:

Exp. Value	Probable Error	$(\text{Error})^2$	Precision Rating	Accuracy Rating	Total Weight
140.1	± 0.2	0.04	1	2	2
140.10	± 0.02	0.0004	100	3	300

The reliability of the data varies considerably from compound to compound. In some cases only one or two determinations of a physical

constant appear in the literature, while in other cases a large amount of data is available. Where very few experimental values are available no "most probable value" has been given, because it is often difficult to tell from the literature which value is most reliable. If several values of a constant have been reported, all or nearly all of which have been determined under the same conditions, the "most probable value" (shown in boldface type at the top of the appropriate column) represents a weighted average. Where the data cover a considerable range of experimental conditions, the constants of an equation relating the physical constant to temperature or pressure have been evaluated by the method of least squares. The "most probable value" at standard conditions is found from this equation, and therefore based on all of the data rather than only on the values determined at standard conditions. Equations calculated in this manner are given under the heading of "Additional Data."

When the constants of an equation were evaluated, the standard deviation (τ) of the experimental values was determined from the formula

$$\tau = \sqrt{\frac{\Sigma v^2}{n}}$$

where v is the difference between the observed values and the calculated values, and n is the number of observations. The Pierce-Chauvenet Criterion[21] was then applied to determine which experimental values were beyond the limits of error. The values lying outside of these limits were discarded and are not published in this volume. Experimental values which were seen graphically to differ widely from the majority of the values were discarded before calculation of the equations. Beyond the range of the equations no experimental values were deleted unless it was obvious from a graph that they were grossly in error.

Method of Calculation

The method of least squares was used to evaluate the constants of the various equations. A theoretical discussion of this method will not be given here, but may be found in a number of mathematical and statistical books. Some of the books treating this subject are:

Scarborough, J. B., "Numerical Mathematical Analysis," The Johns Hopkins Press, Baltimore, 1930.
Whittaker, E. T., and G. Robinson, "The Calculus of Observations," D. Van Nostrand Company, New York, 2nd ed., 1937.
Mills, F. C., "Statistical Methods," Henry Holt and Company, New York, 1939.
Crumpler, T. B., and J. H. Yoe, "Chemical Computations and Errors," John Wiley and Sons, New York, 1940.
Deming, W. E., "Statistical Adjustment of Data," John Wiley and Sons, New York, 1943.
Worthing, A. G., and J. Geffner, "Treatment of Experimental Data," John Wiley and Sons, New York, 1943.

21. Crumpler, T. B., and J. H. Yoe, "Chemical Computations and Errors," John Wiley and Sons, Inc., New York, 1940, p. 190.

Least squares equations may be set up and solved in several different ways. The method used in this work will be given.

The variation of specific gravity with temperature is expressed by the equation

$$D_4^t = D_4^{t_0} + a(t - t_0) + b(t - t_0)^2.$$

Taking $t_0 = 20°$ C, and writing $(t - t_0)$ as Θ and $D_4^{t_0}$ (in this case D_4^{20}) as k the equation may be written

$$(1) \quad D_4^t = k + a\Theta + b\Theta^2.$$

Because three constants, k, a, and b, are to be evaluated, three simultaneous equations are necessary. The first of these consists simply of the sums of the experimental values for specific gravity, temperature difference, the square of the temperature difference, and the number of observations, n.

$$(1a) \quad kn + a\Sigma\Theta + b\Sigma\Theta^2 = \Sigma D$$

The other two equations are obtained by multiplying equation (1) first by Θ, the coefficient of the second unknown, and then by Θ^2, the coefficient of the third unknown and summing the experimental values of the quantities so obtained. The resulting equations are:

$$(2) \quad k\Sigma\Theta + a\Sigma\Theta^2 + b\Sigma\Theta^3 = \Sigma D\Theta$$

$$(3) \quad k\Sigma\Theta^2 + a\Sigma\Theta^3 + b\Sigma\Theta^4 = \Sigma D\Theta^2$$

Equations (1a), (2), and (3) are called "normal equations."

If the experimental values have different weights, n is replaced by ΣW, the sum of the weights. ΣD is then replaced by ΣWD, the sum of the weighted densities, $\Sigma\Theta$ by $\Sigma W\Theta$, the sum of the weighted temperatures, etc.

The quantities to be calculated in order to evaluate k, a, and b, are seen from the normal equations to be ΣW, $\Sigma W\Theta$, $\Sigma W\Theta^2$, $\Sigma W\Theta^3$, $\Sigma W\Theta^4$, ΣWD, $\Sigma WD\Theta$, and $\Sigma WD\Theta^2$.

Several methods for solving the simultaneous equations have been suggested. The one used in this study is relatively simple when a calculating machine is available. For this type of solution the quantities in the normal equations are lined up as follows:

	$A(k)$		$B(a)$		$C(b)$		D	E
(1)	ΣW	(+)	$\Sigma W\Theta$	(+)	$\Sigma W\Theta^2$	(=)	ΣWD	$\Sigma W + \Sigma W\Theta + \Sigma W\Theta^2 + \Sigma WD$
(2)	$\Sigma W\Theta$	(+)	$\Sigma W\Theta^2$	(+)	$\Sigma W\Theta^3$	(=)	$\Sigma WD\Theta$	$\Sigma W\Theta + \Sigma W\Theta^2 + \Sigma W\Theta^3 + \Sigma WD\Theta$
(3)	$\Sigma W\Theta^2$	(+)	$\Sigma W\Theta^3$	(+)	$\Sigma W\Theta^4$	(=)	$\Sigma WD\Theta^2$	$\Sigma W\Theta^2 + \Sigma W\Theta^3 + \Sigma W\Theta^4 + \Sigma WD\Theta^2$

The values in line (1) are then divided by ΣW, those in line (2) by $\Sigma W\Theta$, and those in line (3) by $\Sigma W\Theta^2$.

	$A(k)$	$B(a)$	$C(b)$	D	E
(4)	1	$(+)\ \frac{\Sigma W\theta}{\Sigma W}$	$(+)\ \frac{\Sigma W\theta^2}{\Sigma W}$	$(=)\ \frac{\Sigma WD}{\Sigma W}$	$\frac{\Sigma W + \Sigma W\theta + \Sigma W\theta^2 + \Sigma WD}{\Sigma W}$
(5)	1	$(+)\ \frac{\Sigma W\theta^2}{\Sigma W\theta}$	$(+)\ \frac{\Sigma W\theta^3}{\Sigma W\theta}$	$(=)\ \frac{\Sigma WD\theta}{\Sigma W\theta}$	$\frac{\Sigma W\theta + \Sigma W\theta^2 + \Sigma W\theta^3 + \Sigma WD\theta}{\Sigma W\theta}$
(6)	1	$(+)\ \frac{\Sigma W\theta^3}{\Sigma W\theta^2}$	$(+)\ \frac{\Sigma W\theta^4}{\Sigma W\theta^2}$	$(=)\ \frac{\Sigma WD\theta^2}{\Sigma W\theta^2}$	$\frac{\Sigma W\theta^2 + \Sigma W\theta^3 + \Sigma W\theta^4 + \Sigma WD\theta^2}{\Sigma W\theta^2}$

All members of column A are now one, so that by subtracting line (4) from line (5) and line (6) from line (5) (or any other convenient combination) two simultaneous equations in two unknowns are obtained.

	$B(a)$	$C(b)$	D	E
				$\frac{\Sigma W\theta + \Sigma W\theta^2 + \Sigma W\theta^3 + \Sigma WD\theta}{\Sigma W\theta}$
(7) 5 − 4)	$\frac{\Sigma W\theta^2}{\Sigma W\theta} - \frac{\Sigma W\theta}{\Sigma W}$	$(+)\ \frac{\Sigma W\theta^3}{\Sigma W\theta} - \frac{\Sigma W\theta^2}{\Sigma W}$	$(=)\ \frac{\Sigma WD\theta}{\Sigma W\theta} - \frac{\Sigma WD}{\Sigma W}$	
				$-\ \frac{\Sigma W + \Sigma W\theta + \Sigma W\theta^2 + \Sigma WD}{\Sigma W}$
				$\frac{\Sigma W\theta^2 + \Sigma W\theta^3 + \Sigma W\theta^4 + \Sigma WD\theta^2}{\Sigma W\theta^2}$
(8) (5 − 6)	$\frac{\Sigma W\theta^3}{\Sigma W\theta^2} - \frac{\Sigma W\theta^2}{\Sigma W\theta}$	$(+)\ \frac{\Sigma W\theta^4}{\Sigma W\theta^2} - \frac{\Sigma W\theta^3}{\Sigma W\theta}$	$(=)\ \frac{\Sigma WD\theta^2}{\Sigma W\theta^2} - \frac{\Sigma WD\theta}{\Sigma W\theta}$	
				$-\ \frac{\Sigma W\theta + \Sigma W\theta^2 + \Sigma W\theta^3 + \Sigma WD\theta}{\Sigma W\theta}$

Equations (7) and (8) are divided by the members of the first remaining column (B), and one of the resulting equations is subtracted from the other. Thus an equation with only one unknown is obtained, and may be readily solved. The resulting value of b is substituted in the two equations in two unknowns ((7) and (8)) to obtain the second constant, a. Substitution of the two known constants in the three original equations will lead to the value of the third constant, k. In case a straightline equation with only the constants k and a is sufficient, line 3 and column C are omitted.

The last column, E, serves as a check. If no error in calculation is made, the value obtained by dividing E by A will agree with the sum of the values $\frac{B}{A}+\frac{C}{A}+\frac{D}{A}$, and similarly through the rest of the operations.

A set of experimental specific gravity values and the calculation of the constants of an equation representing the data follows. In this example purely mathematical considerations would indicate the use of a straightline equation instead of a quadratic. The t^2 term was included because the variation of density with temperature should show an appreciable curvature over the one hundred degree range included in the data.

1,1-Diphenylhexadecane

Temp. (t)	$t-20$ (Θ)	Specific Gravity	Weight
20	0	0.9117	4
20	0	0.9135	6
100	80	0.8615	3
50	30	0.8940	3
0	−20	0.9265	3

Θ	Θ^2	Θ^3	Θ^4	D	$D\Theta$	$D\Theta^2$	W
0	0	0	0	0.9117	0	0	4
0	0	0	0	0.9135	0	0	6
80	6,400	512,000	40,960,000	0.8615	68.92	5513.6	3
30	900	27,000	810,000	0.8940	26.82	804.6	3
−20	400	−9,000	160,000	0.9265	−18.53	370.6	3

The weighed sums are:

$$\Sigma W = 19 \qquad \Sigma W\Theta^4 = 125{,}790{,}000$$
$$\Sigma W\Theta = 270 \qquad \Sigma WD = 17.1738$$
$$\Sigma W\Theta^2 = 23{,}100 \qquad \Sigma WD\Theta = 231.63$$
$$\Sigma W\Theta^3 = 1{,}593{,}000 \qquad \Sigma WD\Theta^2 = 20{,}066.4$$

The calculations are carried out as follows:

	$A(k)$	$B(a)$	$C(b)$	D	E
	19	270	23,100	17.1738	23,406.1739
	270	23,100	1,593,000	231.63	1,616,601.63
	23,100	1,593,000	125,790,000	20,066.4	127,426,166.4
(1)	1	14.21052631	1215.789473	0.903884210	1,231.903884
(2)	1	85.5555555	5900.00	0.857888888	5,987.41344
(3)	1	68.9610389	5445.45454	0.868675324	5,516.28425
(3 − 1)		54.75051259	4229.665067	−0.035208886	4,284.380366
(2 − 3)		16.5945166	454.54546	−0.010786436	471.12919
(4)		1	77.2534331	−0.000643078655	78.2527900
(5)		1	27.39130466	−0.000650000012	28.39065465
(4 − 5)			$49.86212844b = 0.000006921357$		
			$b = 0.0_6 1388098987$		

$$54.75051259a + 4229.665067(0.0_6 1388098987) = -0.035208886$$
$$a = -0.000653802196$$

$$16.5945166a + 454.54546(0.0_6 1388098987) = -0.010786436$$
$$a = -0.000653802196$$

$$19k - 270(0.000653802196) + 23{,}100(0.0_6 1388098987) = 17.1738$$
$$k = 0.913006315$$

$$270k - 23{,}100(0.000653802196) + 1{,}593{,}000(0.0_6 1388098987) = 231.63$$
$$k = 0.913007407$$

$$23{,}100k - 1{,}593{,}000(0.000653802196) + 125{,}790{,}000(0.0_6 1388098987) = 20{,}066.4$$
$$k = 0.913006493$$

$$D_4^t = 0.913006 - 0.000653802196(t - 20) + 0.0_6 1388098987(t - 20)^2$$

The equation as it stands is carried out to more decimal places than are warranted by the accuracy of the data, and may be rounded off to $D_4 = 0.9130 - 0.0006538\ (t - 20) + 0.0_6 1388\ (t - 20)^2$. All the decimal places

re kept until the final step has been reached, as rounding off during the calculation may introduce a considerable error.

After the value for constant b has been determined, it is substituted in *both* equations in two unknowns to find constant a. Similarly, a and b are substituted in all three original equations in order to determine k. These multiple substitutions serve as a check on the accuracy of the work. If the constants differ appreciably, an error has probably been made in the calculations.

The constants of equations for melting point, boiling point, and refractive index are determined in a similar manner. The normal equations needed for the calculations are given below.

Melting point:

$$\Sigma tW = k\Sigma W + a\Sigma Wp - b\Sigma Wp^2$$
$$\Sigma tWp = k\Sigma Wp + a\Sigma Wp^2 - b\Sigma Wp^3$$
$$\Sigma tWp^2 = k\Sigma Wp^2 + a\Sigma Wp^3 - b\Sigma Wp^4$$

Boiling point:

$$\Sigma W\frac{1}{T} = k\Sigma W + a\Sigma W \log p$$
$$\Sigma W\frac{1}{T}\log p = k\Sigma W \log p + a\Sigma W(\log p)^2$$

Specific gravity:

$$\Sigma WD = k\Sigma W + a\Sigma Wt + b\Sigma Wt^2$$
$$\Sigma WDt = k\Sigma Wt + a\Sigma Wt^2 + b\Sigma Wt^3$$
$$\Sigma WDt^2 = k\Sigma Wt^2 + a\Sigma Wt^3 + b\Sigma Wt^4$$

Refractive index:

$$\Sigma Wn = k\Sigma W + a\Sigma Wt + b\Sigma Wt^2$$
$$\Sigma Wnt = k\Sigma Wt + a\Sigma Wt^2 + b\Sigma Wt^3$$
$$\Sigma Wnt^2 = k\Sigma Wt^2 + a\Sigma Wt^3 + b\Sigma Wt^4$$

Melting Points

The melting points at atmospheric pressure are listed in order of decreasing temperature. Melting points at other pressures follow in order of decreasing pressure. In some cases the pressures were experimentally determined as kilograms per square centimeter but these values were converted to atmospheres for the purpose of uniformity. One kilogram per square centimeter is equivalent to 0.9678 atmosphere.

Some values have been recorded as freezing points. The freezing point of a substance is coincident with the melting point when defined as the temperature at which the liquid and solid phases are in equilibrium. However, the apparent, or experimentally determined, melting point and freezing point sometimes differ. The process of melting seems to occur with an independent finite speed even above the melting point, so that while it always starts at the same temperature, the temperature of the partly melted portion may rise during the process if heat is supplied at a greater rate than it is absorbed for the transition of solid to liquid.[22] Conversely, liquids may be supercooled to varying degrees before crystalliza-

22. Taylor, H. S., "Treatise on Physical Chemistry," D. Van Nostrand Company, New York, 2nd ed. 1931, pp. 272-273.

tion sets in. The observed temperature at which the liquid and solid are apparently in equilibrium differs from the true freezing point if supercooling has occurred. Even when the freezing point has been determined by extrapolation of a time-temperature curve, this value is significantly in error if the amount of supercooling is large compared to the refrigerating head of temperature.[23] When an author has definitely stated that his value is a freezing point rather than a melting point, this fact has been indicated in a footnote.

Some compounds crystallize in two or more crystalline forms which have different melting points. When the literature indicates that a melting point was determined on a specific form, this information is given in a footnote.

Whenever warranted by the amount of data, a weighted average is given in boldface type. In a few cases melting points at high pressures have been reported. The variation of melting point with pressure may be expressed by the equation

$$t = k + ap - bp^2$$ [24]

where t = melting point and p = pressure. Where high-pressure data are given, the constants of this equation have been evaluated. In these cases the boldface value represents the melting point at one atmosphere.

Boiling Points

For each hydrocarbon the boiling points at 760 mm of mercury are listed first in order of decreasing temperature. The boiling points at other pressures follow in order of decreasing pressure. If the pressure was given in units other than millimeters of mercury, it was converted before being recorded. The pressure in millimeters corresponding to each boiling point is given, unless this pressure is 760 mm, in which case it is omitted.

The variation of boiling point with pressure may be expressed by the integrated form of the Clausius-Clapeyron equation

$$\frac{1}{T} = k + a \log p$$

where T = boiling point in °K and p = pressure in mm of mercury. Where sufficient data at different pressures are given, the constants of this equation have been evaluated. The equation is not valid over a wide range, because the assumptions made in the integration are not strictly true. The differential form of the equation is

$$\frac{dp}{dt} = \frac{\Delta H}{T\Delta V} = \frac{\Delta H}{T(V_g - V_l)}$$

23. Mair, B. J., A. R. Glasgow, Jr., and F. D. Rossini, J. Research Natl. Bur. Standards **26**, 591 **1941**.
24. Tamman, Ann. Physik [N. F.] **66**, 471 **1898**.

where

p = vapor pressure of liquid
t = temperature
T = absolute temperature
ΔH = heat of vaporization
ΔV = change in volume on vaporization
V_g = molecular volume of gaseous phase
V_l = molecular volume of liquid phase

In integrating this equation the assumptions are made that (1) the volume of the liquid, V_l, is negligible in comparison with the volume of vapor, V_g; (2) the heat of vaporization, ΔH, is constant; and (3) the vapor is a perfect gas. These assumptions are only approximately valid, and introduce some errors. The heat of vaporization, ΔH, changes with the temperature so that over a wide range considerable error is caused by assuming it to be constant. The integrated form of the Clausius-Clapeyron equation fits the data well from about 200 to 800 mm of mercury. At higher pressures it is valid over a longer range, at lower pressures over a shorter range.

When boiling points have been determined over a wide range of pressure, separate sets of constants for the equation have been evaluated for different pressure ranges. In this case the boldface value is the boiling point at 760 mm of mercury calculated from the equation valid at 760 mm. When the only available boiling point data were determined at or near 760 mm, the boldface value is the weighted average.

Specific Gravity

Specific gravities determined at 20°C with reference to water at 4°C are listed first, in order of increasing numerical value. Following these are the specific gravities determined at other temperatures, in order of decreasing temperature. Values referred to water at a temperature differing from 4°C follow values at the same temperature referred to water at 4°C, and in order of decreasing temperature of the water, *i.e.*, $D\,25°$, D_{25}^{25}, D_{0}^{25}. A specific gravity determined with reference to water at 4°C is listed as $D\,t$. If the determination was made at temperature t_2 with reference to water at a temperature other than 4°C, t_1, the specific gravity is listed as $D_{t_1}^{t_2}$. This value may be converted to the $D_4^{t_2}$ value by means of the formula

$$D_4^{t_2}\text{ (hydrocarbon)} = D_{t_1}^{t_2}\text{ (hydrocarbon)} \times D_4^{t_1}\text{ (water)}.$$

The variation of specific gravity with temperature is expressed by the equation

$$D_4^t = D_4^{t_0} + a(t - t_0) + b(t - t_0)^2$$

in which t_0 is usually taken as 20°C. Over a 30 to 40 degree range the density is very nearly a linear function of the temperature, and the t^2 term may be disregarded. When the data permitted, the constants of the equation were evaluated. The differential form, or temperature coefficient

of specific gravity, is given under the heading of additional data. This equation is in the form

$$\frac{dD}{dt} = a + 2b(t - t_0) = a\left[1 + \frac{2b}{a}(t - t_0)\right]$$

For shorter ranges this reduces to

$$\frac{dD}{dt} = a.$$

The value of dD/dt at a given temperature is added to the most probable value at 20°C, since t is taken as 20°C.

Lipkin and Kurtz[25] have determined the relationship between the values of constants a and b and the molecular weight of the compound. With very few exceptions the values for these constants determined in this work agree very well with the values postulated by them.

In the case of some compounds with high melting points, most of the specific gravity determinations fell in a temperature range considerably above 20°C. When this was true, t_0 was taken as 50° or 100°C. The boldface value then has the temperature indicated. Boldface values with no indication of temperature are at 20°C.

Refractive Index

Refractive indices are given for the Na_D, H_α, H_β, H_γ, and He lines whenever these values have been reported in the literature. Lines reported as C, F, and G, were assumed to be H_α, H_β, and H_γ respectively. The wave lengths of the above-mentioned lines are given below:

Line	Wave Length (Å)
He_r	6678
H_α	6563
Na_D	5893
He_y	5876
He_g	5016
H_β	4861
H_γ	4341

In most cases the literature does not specify whether a refractive index for a He line is for the red, yellow, or green line. These values have been recorded simply as n^t_{He} values. Na_D line values at 20°C are listed first, followed by values at other temperatures in order of decreasing temperature. The latter are recorded in the form $n\,t°$. Values for lines other than Na_D are listed in the order H_α, H_β, H_γ, and He. Within each group they are listed in order of decreasing temperature. A superscript indicates the temperature, a subscript the line, as $n^{20}_{H_\alpha}$. References to refractive indices at lines other than the ones recorded are given in footnotes.

25. Lipkin, M. R., and S. S. Kurtz, Jr., Ind. Eng. Chem. Anal. Ed. 13, 291 1941.

The refractive index varies with the temperature in a manner analogous to specific gravity, though the temperature coefficient is smaller. The equation is of the same type as that used for specific gravity.

When the data permitted, the temperature coefficient of the Na_D line refractive indices was determined. In almost all cases the temperature range was small enough so that a straight line equation represented the data with sufficient accuracy. The boldface value represents the refractive index for the Na_D line at 20°C.

Additional Data

The additional data column contains values for critical temperature, critical pressure, critical density, angle of rotation for the Na_D line, and sublimation temperatures when these are available. It also contains equations for calculating melting points, boiling points, specific gravities, and refractive indices at other than standard conditions. The range over which the equation is valid is indicated in parentheses.

II. BENZENE AND ITS ALIPHATIC DERIVATIVES

1. Benzene C_nH_{2n-6}
2. Benzene with Alkyl Substitutions C_nH_{2n-6}
3. Benzene with One Alkenyl Substitution C_nH_{2n-8}
4. Benzene with One Alkynyl Substitution C_nH_{2n-10}
5. Benzene with One Alkadienyl Substitution C_nH_{2n-10}
6. Benzene with Two Alkenyl Substitutions C_nH_{2n-10}
7. Benzene with One Alkenynyl Substitution C_nH_{2n-12}
8. Benzene with One Alkatrienyl Substitution C_nH_{2n-12}
9. Benzene with One Alkadiynyl Substitution C_nH_{2n-14}
10. Benzene with One Alkatetraenyl Substitution C_nH_{2n-14}
11. Benzene with Two Alkynyl Substitutions C_nH_{2n-14}
12. Benzene with One Alkatriynyl Substitution C_nH_{2n-18}

1. BENZENE, C_nH_{2n-6}

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Benzene				
5.49	**80.07**	**0.87866**	**1.50096**	Crit. Temp. (°C)
5.91 [313]	80.67 [201]	0.8775 [127,206,247]	1.4993 [236]	290.8 [131]
5.70 [231]	80.60 – 80.67 [2]	0.8776 [268]	1.4995 [110]	290.5 [4]
5.61 [206]	80.5(d)	0.87771 [315]	1.49985(h) [352]	289.9 [96]
5.6 [15,253,405]	80.35 – 80.5 [398]	0.87777 [119]	1.50015 [127]	288.5 [24,117,184,329,354,368,402,404,405]
5.58 [94,223,340,404]	80.49 [340]	0.8779 [269]	1.5003 [125]	
5.56 [240,241]	80.46 [146]	0.87806 [129]	1.500307 [268]	
5.55 [197]	80.35 – 80.45 [389]	0.8782 [401]	1.5004 [242]	288.4 [140,248,246,364,372,378]
5.54 [113]	80.4(e)	0.8784 [89,110]	1.5008 [147]	
5.52(a) [271]	80.36 [52,218]	0.8784(g) [347]	1.5009 [174]	288.1 [293]
5.51 [152,169]	80.35 [23]	0.878434 [282]	1.50092 [370]	288.0 [295]
5.51 ± 0.02 [26]	80.3(f)	0.87847 [176]	1.5010 [291]	287.7 [130]
5.51 ± 0.01 [396,397]	80.2 – 80.3 [34,172,173]	0.8786 [102]	1.50103 [185]	283.4 [122]
5.50 ± 0.01 [28]	80.1 – 80.3 [350]	0.87862 [360]	1.5011 [193,336]	
5.50 [77,89,197,227,350,410]	80.28 ± 0.01 [363]	0.87865 [40]	1.50111 [178]	Crit Pressure (mm Hg)
5.5(b)	80.26 [382]	0.878675(g) [185]	1.50114 [183A]	
5.5(c) [72]	80.25 [238,361,365]	0.8787 [248,325,328]	1.5012 [159]	
5.5 ± 0.2 [171]	80.15 – 80.25 [390]	0.8788 [250,299,301,304,305,358]	1.50122 [127]	38,076.0 [4]
5.4974(a) [300]	80.23 – 80.24 [309,310]		1.50132 [306]	38,053.2 [4]
5.493 ± 0.007 [58]	80.15 – 80.24 [392]	0.8789 [164,239,365]	1.50135 [337,338]	36,404.0 [184]
5.493 ± 0.007(a) [300]	80.23 ± 0.002 [149]	0.87895 [350,411]	1.50137 [53,169]	36,396.40 [368,372]
5.493 ± 0.007(c) [331]	80.20 – 80.21 [28]	0.87896 [127]	1.50138 [191]	
5.49 ± 0.01 [28]	80.16 – 80.21 [391]	0.8790 [39,41,91,141,163,270,277,373,408]	1.5014 [54,89,232,382]	36,395 [402,404,405]
5.49 [211,232,343]	80.20 [28]		1.50148 [329,407,408]	
5.49(c) [65]	80.20 ± 0.02 [349]	0.87901 [103]	1.50149 [179]	
5.485(a) [98]	80.20 ± 0.05 [306]	0.87902 [45]	1.50153 [241]	Crit. Density
5.484 [298]	80.15 – 80.20 [70,200]	0.879063(g) [100]	1.50154 [101]	
5.483 [235,303]	80.2(j)	0.879085(g) [69]	1.50165 [170]	0.3037 [405]
5.483(a) [302]	80.18 [148]	0.8791 [8,303]	1.50209 [6]	0.3043 [295]
5.480 [172]	80.15 – 80.18 [302]	0.87940 [2]	1.50222 [369]	0.3045 [111,373,404]
5.48 [69,78,79,97,166,297]	80.173(k) [341]	0.8794 [66]	1.00177(m) [160]	
5.48(c) [145]	80.17 [403]	0.8796 [193]	1.46178(h) 79.96° [276]	0.305 [122]
5.48 ± 0.02 [28,177]	80.15 – 80.17 [114]	0.8799 [53,54,329]	1.465195(h) 75.09° [276]	
5.47 ± 0.01 [177]	80.15 [80,123]	0.8802 [14]	1.467427 70.0° [268]	
5.47 ± 0.02 [69]	80.10 – 80.15 [392,394]	0.88029 [83]	1.470952 65.0° [268]	
5.46 [215]	80.05 – 80.15 [231]	0.88041 [170]	1.471975(h) 65.00° [276]	
5.42 – 5.46 [114]	80.14 [356]	0.88048(g) [407]	1.474218 60.0° [268]	
5.458 [216]	80.12 – 80.13 [118]	0.8807 [382]	1.4744 60° [291]	
5.449 – 5.455 [182]	80.03 – 80.13 [267]	0.4514 280° [213,295,373]	1.477637 55.0° [268]	
5.45 [87,110,174,202,290]	80.122 [411]		1.480905 50.0° [268]	
5.45 ± 0.05 [61]	80.12 [89,334]	0.4708 275° [295]	1.4811 50° [291]	
5.44 – 5.445 [30,233,353]	80.08 – 80.12 [12,150]	0.4984 270° [373]	1.48520(h) 45.03° [276]	
5.44(a) [234]	80.110 [342]	0.4985 270° [296]	1.4851 45° [112]	
5.432 [145]	80.10 [105]		1.485545 43.0° [268]	

The notes designated by letters appear on pages 37 and 38.

M. P., °C	B. P., °C @ 760mm	D_4^{20}		n_D^{20}		Additional Data
Benzene	80.1(l)	0.5327	260° [213],	1.485641	42.6° [268]	*
(Continued)	80.0 – 80.1 [383]		[295]	1.48842(h)	40.07° [276]	
	80.094 [127,335]	0.5328	260° [373]	1.487573	40.0° [268]	
5.43 [42,181,239,251,254,345,384]	80.094 ± 0.002 [396]	0.5609	250° [373]	1.4877	40° [291]	
5.42 [190,257,264]	80.093 ± 0.002 [397]	0.5610	250° [295]	1.49168(h)	35.06° [276]	
5.41 [279]	80.09 [190]	0.5851	240° [373]	1.490732	35.0° [268]	†
5.40 [128]	80.05 – 80.08 [314]	0.5852	240° [213],	1.4918	35° [112]	
5.4(i)	80.05 – 80.07 [128]		[295]	1.493408	31.0° [268]	
5.4(c) [158,383]	80.05 [56,76]	0.6065	230° [373]	1.49497(h)	30.05° [276]	
5.4 ± 0.2 [171]	79.99 – 80.05 [133]	0.6066	230° [295]	1.4943	30° [291]	‡
5.35 [5,143,345]	80.04 [104]	0.6255	220° [373]	1.494815(h)	30° [118]	
5.345 [74]	80.00 ± 0.08 [61]	0.6256	220° [213],	1.49486	30° [56]	
5.340 [74]	80.0(o)		[295]	1.494888(h)	30° [76]	
5.32 [135,344]	80(p) [193,294,369]	0.6432	210° [295],	1.49534	30° [81]	§
5.3 [204,221,366]	79.6 [93,196,311]		[373]	1.4960	28.6° [115]	
5.25 [154]	118(q) [16]	0.6605	200° [373]	1.497705(h)	25.2° [309,310]	
5.1 [136]	106(r) [16]	0.6610	200° [213],	1.496991	25.0° [268]	
5.075 [29]	94(s) [18]		[295]	1.4970	25° [108]	
6.0(n) [17]	87(t) [17]	0.6758	190° [295],	1.49765	25° [392]	¶
atm	82.02(v) [217]		[373]	1.49774	25° [46]	
204.2 11,000 [49]	81.35(u) [217]	0.6906	180° [213],	1.49779	25° [375]	
190.5 10,000 [49]	81.28(v) [217]		[295,373]	1.4979	25° [69]	
176.7 9,000 [49]	288.0 36,226 [402]	0.7043	170° [295],	1.49794(h)	25° [151]	⊙
162.2 8,000 [49]	286.7 35,436 [402]		[373]	1.49795	25° [21,22]	
147.2 7,000 [49]	284.3 34,594 [402]	0.7185	160° [213],	1.49807		
131.2 6,000 [49]	280 33,713 [371]		[295,373]	± 0.00006	25° [396,397]	
114.6 5,000 [49]	280 32,782(w) [402]	0.7310	150.0° [248],	1.49815	25° [338]	
96.6 4,000 [49]	270 28,852(w) [402]		[295,373]	1.49819	25° [391]	⊖
93.2 3,871 [289]	260 26,372 [371]	0.7448	140.1° [248]	1.49823	25° [227]	
88.3 3,629 [289,290]	260 25,329 [402]	0.7440	140° [213],	1.49825(h)	25.00° [276]	
86.4 3,532 [290]	255 24,306.05 [126]		[295,373]	1.4983	25° [112]	
84.3 3,436 [289]	250 22,182(w) [402]	0.7470	130.2° [248]	1.4992	25° [225]	⊕
83.4 3,387 [289]	240 20,231 [371]	0.7472	130.0° [248]	1.4993	23.7° [115]	

Additional Data

* $t_m = 5.459 + 0.028149\ p_{atm} - 0.000001546\ p_{atm}^2$ (1 to 4,000 atm

† $t_m = 5.461 + 0.026732\ p_{atm} - 0.0000009202\ p_{atm}^2$ (1 to 9,000 atm)

‡ $\frac{1}{T_b} = 0.004446498 - 0.00055258 \log_{10} p_{mm}$ (14 to 200 mm)

§ $\frac{1}{T_b} = 0.00452385 - 0.00058937 \log_{10} p_{mm}$ (200 to 790 mm)

¶ $\frac{1}{T_b} = 0.004586504 - 0.00060907 \log_{10} p_{mm}$ (790 to 5,500 mm)

⊙ $\frac{dD}{dt} = -0.00106304[1 + 0.00088019(t - 20)]/°C$ (0 to 100°C)

⊖ $\frac{dD}{dt} = -0.00108579[1 - 0.0014520(t - 20) + 0.00002675(t - 20)^2]/°C$ (0 to 160°C)

⊕ $\frac{dn}{dt} = -0.00063190[1 + 0.002461(t - 20)]/°C$ (2 to 80°C)

The notes designated by letters appear on pages 37 and 38.

M. P.,°C		B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
Benzene		240	19,393.12 [126]	0.7568	130° [295,373]	1.49898	22° [142]	
(Continued)		240	19,352(w) [402]			1.49966	22° [37]	
		230	16,825(w) [402]	0.7576	130.0° [248]	1.49982	22° [157]	
	atm	220	15,192 [371]	0.7692	120.2° [248]	1.4979	21.5° [115]	
80.7	3,387 [345]	220	14,493(w) [402]	0.7692	120° [213,295]	1.50008	21.37° [124]	
78.5	3,145 [290]	210	12,453(w) [402]			1.49900	21° [163]	
77.7	3,000 [49]	200	11,134 [371]	0.7692	119.9° [373]	1.4990	21° [108]	
73.6	2,903 [289]	200	10,860 [126]	0.7749	110.4° [248]	1.501545	20.5° [64]	
72.7	2,903 [345]	200	10,650(w) [402]	0.7807	110.0° [248]	1.50143	20.1° [370]	
73.50	2,882 [344]	190	9,045(w) [402]	0.7809	110° [373]	1.5007	18.5° [108]	
69.99	2,754 [345]	180	7,630(w) [402]	0.7810	110° [295]	1.5027	18.5° [275]	
66.7	2,565 [290]	170	6,386(w) [402]	0.7750	109.9° [248]	1.5030	18° [409]	
66.0	2,536 [345]	160	5,300(w) [402]	0.79030	100.00° [222]	1.50300	17° [163]	
63.8	2,420 [289]	162	5,274.93 [126]			1.502328	16.8° [268]	
63.5	2,420 [345]	150	4,332(w) [402]	0.79038	100° [40]	1.503771	16.7° [217]	
63.67	2,418 [344]	140	3,520(w) [402]	0.7919	100.0° [248]	± 0.000007(u)		
60.00	2,232 [345]	130	2,815(w) [402]	0.7927	100° [373]	1.50325	16.5° [400]	
56.0	2,032 [290]	125	2,464 [327]	0.7928	100° [213,295]	1.5033	16.5° [291]	
56.5	2,000 [49]	121	2,347.4 [411]			1.5034	16° [163]	
55.02	1,974 [345]	121	2,259.95 [126]	0.8033	90.2° [248]	1.5038	16.0° [194]	
54.0	1,936 [345]	120	2,243 [106,318]	0.8004	90.1° [248]	1.5038	15° [135]	
53.7	1,936 [289]	120	2,240 [333,334]	0.80190	90° [40]	1.50402	15° [142]	
54.99	1,918 [344]	120	2,236.80 [25]	0.8041	90° [373]	1.50439	15° [81,350]	
50.03	1,747 [345]	120	2,230(w) [402]	0.8042	90° [295]	1.50453	15° [163]	
45.20	1,506 [344]	115.624	2,026.3 [411]	0.81328	80.37° [103]	1.504551	15° [113]	
43.8	1,500 [290]	115	1,983 [333]	0.8118	80.0° [248]	1.503727	14.8° [268]	
43.15	1,452 [345]	110	1,751 [333,334]	0.8124	80° [34]	1.503819	14.4° [268]	
42.6	1,452 [289]	110	1,746.20 [25]	0.8126	80° [247]	1.50690	12.5° [7]	
42.06	1,408 [345]	108	1,744 [59]	0.8127	80° [213,295]	1.50565	12.3° [369]	
40.06	1,327 [345]	109.601	1,741.0 [411]	0.81331	80° [2]	1.505543	12.0° [268]	
34.41	1,053 [344]	110	1,739(w) [402]	0.81367	80° [103]	1.50626	11.06° [124]	
31.7	1,016 [49,290]	105	1,542 [333]	0.81374	80° [40]	1.506051	11.0° [268]	
32.5	1,000 [49]	103.621	1,489.2 [411]	0.8145	80° [373]	1.506538	10.5° [268]	
32.2	968 [77]	100	1,371 [32]	0.8146	80.0° [248]	1.506792	10° [268]	
31.45	968 [345]	100	1,348 [333,334]	0.8121	79.9° [316]	1.50871	8.5° [274]	
30.2	968 [289]	100	1,344 [106,318,319]	0.81297	79.9° [256]	1.50808	8.2° [186]	
31.51	936 [344]			0.81360	79.74° [276]	1.50853	8° [142]	
30.05	917 [345]	100	1,342.20 [25]	0.8121	79.7° [248]	1.5100	8° [163]	
29.86	902 [344]	100	1,339 [327]	0.81380	79.70° [222]	1.50908	6.8° [370]	
29.59	895 [345]	100	1,335(w) [402]	0.8150	79.2° [99]	1.5103	6.5° [163]	
30.00	887 [77]	97.683	1,268.1 [411]	0.8147	78.0° [294]	1.51011	5.6° [370]	
27.99	808 [344]	95	1,184 [326]	0.81556(g)	77.98° [276]	1.5103	5.51° [169]	
25.00	705 [77]	95	1,180 [333]	0.8178	75° [189]	1.5122	2.0° [115]	
25.05	696 [344]	91.787	1,074.6 [411]	0.818721	75° [280,281]	1.49051	$n_{H\alpha}^{30}$ [81]	
24.84	696 [344]	90	1,039 [32]	0.81886(g)	75° [276]	1.49312	$n_{H\alpha}^{25}$ [220]	
21.5	629 [290]	90	1,018 [333,334]	0.81923	75° [2]	1.49329(h)	$n_{H\alpha}^{25}$ [151]	
20.00	521 [77]	90	1,015 [318]	0.8220	72.7° [236]	1.4933	$n_{H\alpha}^{25}$ [75]	
20.13	516 [345]	90	1,014.40 [25]	0.82244	72.06° [363]	1.49441	$n_{H\alpha}^{22}$ [142]	
19.96	508 [344]	90	1,008(w) [402]	0.82403(g)	70.36° [276]			
20.03	499 [344]	90	1,008 [368]	0.8226	70.2° [248]			

The notes designated by letters appear on pages 37 and 38.

M. P.,°C		B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
Benzene		85.912	906.1 [411]	0.8231	70.1° [348]	1.4934	$n_{H\alpha}^{21.5}$ [115]	
(Continued)		86	906 [59]	0.8234	70° [247]	1.49547	$n_{H\alpha}^{20.5}$ [64]	
		85	879 [333]	0.8237	70.0° [268]	1.49638	$n_{H\alpha}^{20}$ [185]	
	atm	84.079	857.82 [335]	0.8241	70° [189]	1.49646	$n_{H\alpha}^{20}$ [178]	
19.33	486 [344]	83.285	837.56 [335]	0.82442	70° [40]	1.49668	$n_{H\alpha}^{20}$ [53]	
19.35	484 [345]	82.606	820.59 [335]	0.8246	70° [219]	1.4967	$n_{H\alpha}^{20}$ [54]	
18.85	484 [77]	82.022	806.21 [335]	0.8248	70° [239,373]	1.49678	$n_{H\alpha}^{20}$ [407,408]	
17.8	484 [289]	81.417	791.46 [335]	0.8249	70° [358]	1.49690	$n_{H\alpha}^{20.0}$ [170]	
17.80	432 [344]	80.822	777.20 [335]	0.82492	70° [103]	1.50043	$n_{H\alpha}^{17.7}$ [95]	
17.56	412 [154]	80.29		0.82505	70° [2]	1.4988	$n_{H\alpha}^{16.0}$ [194]	
16.44	387 [154]	−80.48	770 [278]	0.8260	70.0° [248]	1.49938	$n_{H\alpha}^{15}$ [142]	
15.78	368 [344]	80.2	768 [113]	0.8229	69.9° [248]	1.49952	$n_{H\alpha}^{15}$ [81,350]	
15.32	348 [154]	80.5	767.2 [137]	0.8270	67.9° [236]	1.499659	$n_{H\alpha}^{15}$ [113]	
15.00	338 [77]	80.299	764.84 [335]	0.8292	65.0° [268]	1.50119	$n_{H\alpha}^{12.3}$ [369]	
14.77	329 [154]	80.35	764.68 [80]	0.82993(g)	65° [276]	1.4983	$n_{H\alpha}^{10.0}$ [115]	
14.83	325 [344]	80.30	763.47 [80]	0.83078	65° [2]	1.50381	$n_{H\alpha}^{8.5}$ [274]	
13.95	300 [154]	80.35	763.1 [137]	0.8294	64.88° [169]	1.50370	$n_{H\alpha}^{8.2}$ [186]	
13.8	300 [77]	80.35	763 [360]	0.83316	62.30° [363]	1.50383	$n_{H\alpha}^{8}$ [142]	
13.65	290 [154]	80.0		0.8322	61.8° [348]	1.50721	$n_{H\beta}^{30}$ [81]	
13.25	275 [154]	−80.2	763 [35]	0.83496	60.70° [229]	1.5094	$n_{H\beta}^{28.6}$ [115]	
12.53	251 [154]	80.3	762.9 [137]	0.8337	60.3° [348]	1.50985	$n_{H\beta}^{25}$ [151]	
12.45	250 [154]	80.27		0.83594	60.3° [216]	1.5109	$n_{H\beta}^{23.7}$ [115]	
11.99	232 [154]	±0.01	762 [174]	0.8364	60.2° [248]	1.51090	$n_{H\beta}^{22}$ [142]	
11.80	225 [154]	80.3	761.5 [137]	0.8342	60.0° [247, 248]	1.5095	$n_{H\beta}^{21.5}$ [115]	
11.10	200 [154]	80.45	761.1 [381]			1.511207	$n_{H\beta}^{20.5}$ [64]	
10.87	193 [154]	79.7		0.8346	60° [169]	1.51301	$n_{H\beta}^{20}$ [185]	
10.41	176 [344]	−80.0	761 [116]	0.8353	60° [304]	1.51323	$n_{H\beta}^{20}$ [178]	
10.40	175 [154]	80.25	760.8 [137]	0.83546	60° [40]	1.51324	$n_{H\beta}^{20.0}$ [170]	
10.00	161 [77]	79.9	760.4 [256]	0.8357	60° [91,239, 365,373]	1.51339	$n_{H\beta}^{20}$ [53]	
10.12	156 [345]	80.16	760.23 [80]			1.51350	$n_{H\beta}^{20}$ [407,40]	
9.78	155 [154]	80.4	760.2 [43]	0.8358	60.0° [268]	1.5144	$n_{H\beta}^{18.5}$ [275]	
9.60	150 [154]	80.08	758.39 [80]	0.83584	60° [103]	1.51480	$n_{H\beta}^{17.7}$ [95]	
9.66	141 [344]	80.1	758 [191]	0.8359	60° [352]	1.5156	$n_{H\beta}^{16.0}$ [194]	
9.24	136 [154]	80.09	758.0 [407]	0.83602(g)	60.00° [69]	1.51610	$n_{H\beta}^{15}$ [142]	
8.90	125 [154]	80	757.5 [333,334]	0.83642	60° [2]	1.51633	$n_{H\beta}^{15}$ [81,350]	
8.15	100 [154]	80.04		0.83645	60° [129]	1.516392	$n_{H\beta}^{15}$ [113]	
7.45	75 [154]	−80.14	757.4 [346]	0.8368	59.54° [243]	1.51817	$n_{H\beta}^{12.3}$ [369]	
6.80	50 [154]	80.12	757.3 [203]	0.8352	59° [348]	1.5148	$n_{H\beta}^{10.0}$ [115]	
6.10	25 [154]	80.03	757.24 [80]	0.8376	58.90° [272]	1.52086	$n_{H\beta}^{8.5}$ [274]	
5.5006	0 [300]	80.2		0.83751	58.33° [363]	1.52055	$n_{H\beta}^{8.2}$ [186]	
5.415	0 [98]	−80.3	757 [338]	0.8370	58.3° [236]	1.52069	$n_{H\beta}^{8}$ [142]	
5.35	0 [345]	80.0		0.8392	56.7° [120]			
5.33	0 [154]	−80.2	757 [111]	0.8403(g)	56.00° [69]			
		80.001	756.49 [80]	0.8397	55° [34]			
		79.9		0.8403	55.0° [268]			
		−80.1	756 [357]	0.84198	55° [2]			
		80	755 [106,318, 319,368]	0.8387	54.8° [381]			
				0.8429	52.0° [348]			
		80.0	753.6 [157]	0.844675(g)	52.00° [69]			
		79.9	753.4 [296]	0.8470	50.4° [248]			

The notes designated by letters appear on pages 37 and 38.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
Benzene (*Continued*)	79.796	753 08 [335]	0.8453	50.2° [248]	1.5242	$n_{H\beta}^{2.0}$ [115]	
	79.5		0.8450	50° [247]	1.5201	$n_{H\gamma}^{25}$ [75]	
	−79.7	753 [90]	0.8456	50.0° [268]	1.52015(h)	$n_{H\gamma}^{25}$ [151]	
	80	752.74 [25]	0.846170	50° [280,281]	1.52119	$n_{H\gamma}^{22}$ [142]	
	79.78	752.6 [84]	0.84639	50° [40]	1.5205	$n_{H\gamma}^{21.5}$ [115]	
	79.6	752 [147]	0.8466	50° [239,347]	1.522042	$n_{H\gamma}^{20.5}$ [64]	
	79.7		0.8467	50° [91,358]	1.52375	$n_{H\gamma}^{20}$ [407,408]	
	−79.8	751.4 [258]	0.84678	50° [103]	1 52377	$n_{H\gamma}^{20}$ [53]	
	79.98	751 [102]	0.84748	50° [2]	1.52380	$n_{H\gamma}^{20}$ [178]	
	79.5		0.84911(g)	48.00° [69]	1.5261	$n_{H\gamma}^{16.0}$ [194]	
	−79.7	750.7 [224]	0.84874	47.95° [363]	1.52656	$n_{H\gamma}^{15}$ [142]	
	79.75	750 [362]	0.8486	47.0° [348]	1.52681	$n_{H\gamma}^{15}$ [350]	
	79.70	750 [308]	0.8494	46.50° [169]	1.526963	$n_{H\gamma}^{15}$ [113]	
	79.64		0.8510	46.5° [236]	1.52867	$n_{H\gamma}^{12.3}$ [369]	
	−79.70	749.0 [197]	0.8500	46.0° [294]	1.5258	$n_{H\gamma}^{10.0}$ [115]	
	79.6	748.6 [9,10]	0.85104	45.95° [222]	1.53154	$n_{H\gamma}^{8.5}$ [274]	
	79.49		0.8503	45.0° [268]	1.53097	$n_{H\gamma}^{8.2}$ [186]	
	−79.55	747.7	0.85201(g)	45° [276]	1.53125	$n_{H\gamma}^{8}$ [142]	
		−748.3 [239]	0.85291	45° [2]	1.50247	n_{He}^{20} [87]	
	79.6	748 [33]	0.8536	45° [209]	1.497005	n_{He}^{15} [113]	
	79.6	747.5 [408]	0.8507	44.8° [348]	1.50446	n_{He}^{15} [350]	
	79.2	747 2 [256]	0.85343(g)	44.00° [69]	(x)		
	79.2	746 7 [256]	0.8533	43.0° [268]			
	79.65	746.2 [143]	0.85462	42.65° [272]			
	79.6	744.5 [261,263]	0.85512(g)	42.16° [276]			
	79.47	744.5 [197]	0.8547	41.5° [381]			
	79.6	743.1 [296]	0.8557	41° [379]			
	79.4	743 [339]	0.85683	40.7° [245]			
	79.32	742.3 [143]	0.8555	40.5° [348]			
	79.6	742 [57]	0.8557	40° [247]			
	79	742 [31]	0.8559	40.0° [268]			
	79.2	740.8 [84]	0.85661	40° [119]			
	79.2	740 [88]	0.8569	40° [304]			
	79	740 [32]	0.85697(g)	40° [347]			
	79	739.5 [262]	0.85721	40° [40]			
	79.201	739.35 [335]	0.8573	40° [358]			
	79.3	739 [53]	0.8575	40° [239]			
	78.1	735.75 [201]	0.85750(g)	40° [276]			
	78.70		0.85752	40° [129]			
	−78.73	735 [63]	0.8576	40° [91,365,373]			
	78.9	733 [65]					
	79.2	731.1 [321,322]	0.85765	40° [108]			
	78.6	728.9 [315]	0.85769(g)	40.00° [69]			
	78.606	725.77 [335]	0.8578	40° [267]			
	78.45	724 [352]	0.85829	40° [2]			
	78.36	720 [124]	0.8587	38.3° [379]			
	78.30	718 6 [124]	0.85963(g)	38° [276]			
	78.0	718 [400]	0.8617	36.15° [248]			
	78.015	712.55 [335]	0.86183(g)	36° [276]			
	78.0	712.5 [162]	0.8620	36.0° [236]			

The notes designated by letters are shown on pages 37 and 38.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}	Additional Data
Benzene (*Continued*)	77.8	707.52 [315]	0.86205(g)	36.00° [69]		
	77.7	700 7 [321,322]	0.8612	35.0° [268]		
	77.9	700 [167]	0.86362	35° [2]		
	77.430	699.60 [335]	0.8639	35° [209]		
	76.841	686.81 [335]	0.8609	34.95° [304]		
	76 65	684.6 [296]	0.86310	34.95° [350]		
	76.3	675.41 [315]	0.8626	34.0° [348]		
	76.261	674.35 [335]	0.86393(g)	34° [276]		
	75.532	658.96 [335]	0.8616	33.51° [169]		
	75	650 [333]	0.86466	33.51° [350]		
	74.9	643.7 [315]	0.86531	32.90° [350]		
	75.0	642.3 [157]	0.8645	32.5° [381]		
	74.9	640 [285]	0.86613(g)	32° [276]		
	74.352	633.90 [411]	0.866245(g)	32.00° [69]		
	74.1	630.3 [296]	0.8658	31.0° [348]		
	73.4	614.1 [256]	0.8659	31.0° [268]		
	73.2	610.79 [315]	0.86828	30.10° [222]		
	72.9	606.6 [256]	0.8665	30° [247]		
	73.0	601.5 [321,322]	0.86657	30° [60]		
	73.0	600 [167]	0.86704	30° [287,288]		
	72.1	600 [399]	0.86719	30° [119]		
	72.0	588 [62]	0.8672	30° [292]		
	71.85	582.0 [296]	0.8679	30° [358]		
	71	575 [32]	0.86796	30° [40]		
	70	551.5 [106,318]	0.8680	30° [267]		
	70	551.2(w) [319]	0.868020(g)	30° [118]		
			0.86825(g)	30° [276]		
	70	551 [333,334]	0.86828(g)	30° [50]		
	70.1	550 [167]	0.86836	30° [45]		
	69.5	550 [399]	0.8684	30° [81,91]		
	70	548.16 [368]	0.86840(g)	30° [68,76]		
	70	547.41 [25]	0.86844	30° [350]		
	70.0	547.4 [157]	0.8685	30° [238]		
	70	547 [188]	0.86856	30° [103]		
	69.25	534.6 [296]	0.86891	30° [2]		
	68.625	525.76 [411]	0.8697	30° [14]		
	69	525.4 [59]	0.8691	28.8° [236]		
	67.7	510.05 [315]	0.8697	28.8° [350]		
	67.3	500.5 [321,322]	0.8709	28.6° [115]		
	67.4	500 [167]	0.870586(g)	28.00° [69]		
	67.2	497.6 [296]	0.8710	27.3° [36]		
	66	477 [323]	0.8690	27° [163]		
	65	463 [333,334]	0.8704	26.9° [36]		
	65.0	461.2 [157]	0.87178	26.9° [320]		
	64.2	459.49 [315]	0.8706	26.7° [36]		
	64.2	454.1 [256]	0.8708	26.5° [36]		
	64.1	450.1 [256]	0.8713	26.1° [36]		
	64.4	450 [167]	0.8715	26 0° [268]		
	63.6	450 [399]	0.8738	25.9° [36]		
	63.6	440.0 [296]	0.8739	25.8° [36]		

The notes designated by letters are given on pages 37 and 38.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}	Additional Data
Benzene (*Continued*)	62.940	433.6 [411]	0.8719	25.7° [36]		
	63	433.0 [59]	0.87336	25.25° [272]		
	60.9	401 [321,322]	0.87343	25.25° [350]		
	60.3	400 [399]	0.8732	25.13° [28]		
	60.0	395.9(w) [319]	0.8734	25.13° [212]		
			0.8724	25° [116]		
	60	394.75(w) [106,318]	0.872627	25° [280,281]		
			0.8728(g)	25° [173,225]		
	60	389.34 [25]	0.87287	25° [46]		
	60	389 [223]	0.87288	25° [220]		
	60.0	388.6 [157]	0.8729	25° [189]		
	59.3	380 [323]	0.8731	25° [385,386,388]		
	58.8	371.4 [296]				
	58.5	369 [32]	0.8733(g)	25° [61,387]		
	57.298	355.1 [411]	0.8734	25° [353,358]		
	57.5	354.6 [59]	0.87345	25° [314]		
	57.0	350 [167]	0.8735	25° [99,157]		
	56.6	350 [399]	0.8736	25° [26,257]		
	56.4	339.5 [296]	0.87360			
	55.0	323.3 [157]	± 0.00005	25.00° [260]		
	54.7	314.5 [256]				
	54.25	313.9 [296]	0.87362(g)	25° [168,276]		
	53.2	303.5 [256]	0.87363	25° [21,22]		
	52.9	301.4 [321,322]	0.87366			
	52.6	300 [167]	± 0.00002	25° [396]		
	52.5	300 [399]	0.873670			
	51.697	289.1 [411]	± 0.000004			
	52	288.5 [59]		25° [397]		
	51.85	287.4 [296]	0.87369	25° [250]		
	50	274.5(w) [319]	0.8737	25° [85]		
			0.8738	25° [75]		
	50	273.0 [324]	0.8741	25° [66]		
	50	271 [323]	0.87417	25° [2]		
	50	270.17 [25]	0.8742	25° [209]		
	50.0	269.0 [157]	0.874212	D_{25}^{25} [384]		
	50	268 [146,326]	0.8754	D_{25}^{25} [180]		
	49.99	268.0 [375]	0.8758	D_{25}^{25} [224]		
	50.1	267.0 [296]	0.87596	D_{25}^{25} [157]		
	49.36	263.3 [296]	0.8767	D_{25}^{25} [273]		
	47.9	250 [167]	0.87411	24.42° [363]		
	47.8	250 [399]	0.87270	24.27° [190]		
	47.8	249.6 [321,322]	0.8740	24° [163]		
	47.94	249.1 [296]	0.87485(g)	24.00° [69]		
	46	233.1 [59]	0.8742	23.8° [36]		
	45.97	230.0 [296]	0.8760	23.7° [115]		
	45	224 [183]	0.8740	23° [164]		
	44.7	221.0 [296]	0.8741	23.0° [288]		
	45.0	220.7 [157]	0.8748	23° [107]		
	43.71	209.6 [296]				
	42.5	202.1 [321,322]				

The notes designated by letters are shown on pages 37 and 38.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}	Additional Data
Benzene (*Continued*)	42.1	200 [167,399]	0.87575	23° [355]		
	42.0	200 [32]	0.8759	22.3° [36]		
	41.41	190.8 [296]	0.87648(g)	22° [284]		
	41.3	187.9 [256]	0.87651	22° [283]		
	40	186.9 [59]	0.8773	21.5° [115]		
	40	185.7(w) [106]	0.87790	21° [350]		
			0.87811	21° [45]		
	40	185.5 [318]	0.87786	20.58° [362]		
	40	185.3(w) [319]	0.8773	20.5° [381]		
			0.87889	20.5° [64]		
	40	184.0 [324]	0.87874	20.2° [350]		
	41.5	182.5 [214]	0.87893	20.2° [194]		
	40	182.35 [25]	0.8783	20.15° [28]		
	40.0	181.1 [157]	0.8789	D_{20}^{20} [147]		
	40	177.3 [326]	0.88008	D_{20}^{20} [162]		
	39.35	174.95 [296]	0.8790	19.9° [373]		
	40.1	174.9 [256]	0.88034	$D_{19.80}^{19.80}$ [51]		
	38.78	173.0 [296]	0.88112	19.75° [272]		
	35.5	150.8 [296]	0.87948	19.5° [350]		
	35.4	150.5 [214]	0.8802	19° [163]		
	35.4	150.2 [321,322]	0.8815	18.5° [275]		
	35.4	150 [167]	0.88063	18.4° [350]		
	35.2	150 [399]	0.88084	18.4° [194]		
	35	148.8 [59]	0.8799	18.1° [379]		
	34.8	147 [323]	0.8808	18° [376]		
	35.0	146.3 [157]	0.88103	18° [246]		
	35	145.4 [325, 328]	0.88118	18.0° [402]		
	33.6	137.9 [296]	0.88181	18° [228]		
	31.4	125.85 [296]	0.8823	18° [164]		
	30.87	123.45 [296]	0.8829	18° [325]		
	30	121.8 [324]	0.88110	17.95° [350]		
	31.0	120 [214]	0.88101	17.90° [363]		
	30	119.25 [25]	0.8819	17.7° [95]		
	30	118.6(w) [319]	0.8800	17.4° [348]		
			0.88190	17.2° [350]		
	30.0	118.2 [157]	0.8821	17.2° [236]		
	30	118 [32]	0.8804	17.0° [348]		
	30	117.45 [368]	0.8830	17° [163]		
	30	116 [327]	0.8826	16.35° [169]		
	30	115.8 [326,328]	0.88279	16.35° [350]		
	28.15	109.35 [296]	0.88284	16.3° [350]		
	26.4	100 [167]	0.88307	16.3° [194]		
	26.3	100 [321,322]	0.8828	16.20° [169]		
	26.0	100 [399]	0.88293	16.2° [350]		
	25.37	96.4 [296]	0.88226	16° [315]		
	25.0	95.90 [332]	0.88422	16° [155]		
	25	95.9 [244]	0.88336	15.8° [350]		
	25	94.9 [106]	0.8835	15.8° [236]		
	25.0	94.0 [157]				

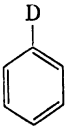
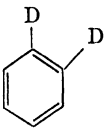
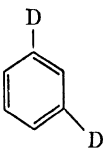
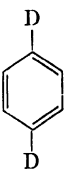
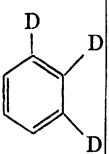
The notes designated by letters are given on pages 37 and 38.

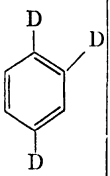
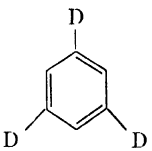
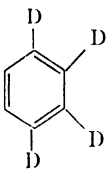
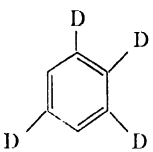
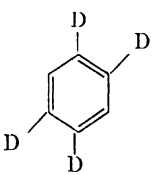
M. P., °C	B. P., °C @ 760mm		D_4^{20}		n_D^{20}	Additional Data
Benzene (*Continued*)	23.5	92.0 [59]	0.8824	15.5° [268]		
	22.97	85.5 [296]	0.8845	15.5° [150]		
	22.3	80.5 [214]	0.8846	$D_{15.5}^{15.5}$ [165]		
	20.54	77.25 [296]	0.8850	15.4° [163]		
	20	76.5 [106,318]	0.8826	15° [110]		
	20	76.2(w) [319]	0.8828	15° [82]		
			0.883573	15° [280,281]		
	20	76.0 [324]	0.8841	15° [81]		
	20	75.6 [214]	0.8840	15.0° [122]		
	20	75.14 [25]	0.88420	15° [350]		
	20.0	75.0 [15,167,188]	0.8842	15° [237]		
			0.8844	15° [358]		
	20.0	74.7 [157]	0.8846	15° [66,209]		
	20	74.66 [139]	0.88462	15° [2]		
	20	74.13 [368]	0.8853	D_{15}^{15} [273]		
	20	74.0 [326,378]	0.8872	15° [163,164]		
	18.5	71.4 [59]	0.88434	14.95° [222]		
	18	71 [32]	0.88501	14.5° [191]		
	18.72	70.75 [296]	0.8847	14.40° [363]		
	18	70 [15]	0.8853	14° [255]		
	16.85	64.5 [296]	0.88551	13.5° [45]		
	15	59 [146]	0.88578	13.5° [350]		
	15.0	58.2 [157]	0.88638	12.87° [359]		
	14.66	57.8 [296]	0.8867	12.3° [369]		
	15	55 [317]	0.88741	11.92° [363]		
	14	54.9 [59]	0.8871	11.2° [294]		
	12.51	51.65 [296]	0.8886	10.7° [143]		
	12.1	50 [167]	0.8876	10.5° [348]		
	11.8	50 [399]	0.8868	10.0° [115]		
	11.7	49 [167]	0.8878	10.0° [268]		
	11.3	48 [167]	0.8880	10° [247]		
	10.44	47.25 [296]	0.88834	10° [119]		
	10.9	47 [167]	0.88930	10° [40]		
	10.5	46 [167]	0.8894	10° [239]		
	10	46.0(w) [319]	0.88945	10° [350]		
			0.88946	10° [363]		
	10.0	45.4 [157]	0.8895	10° [91]		
	10	45.34 [25]	0.88956	10° [245]		
	10.6	45.19 [368]	0.88962	10° [103]		
	10.1	45 [167]	0.8898	10° [66]		
	10	44.6 [326]	0.88982	10° [2]		
	9.6	44 [167]	0.8900	D_{10}^{10} [273]		
	9.21	43.0 [296]	0.89137	8.5° [274]		
	9.2	43 [167]	0.8896	8.4° [348]		
	8.8	42 [167]	0.8906	8.2° [186]		
	8.5	41.8 [59]	0.8904	8.0° [348]		
	8.37	41.8 [296]	0.89291	7.1° [194]		
	8.3	41 [167]	0.89260	7° [350]		
	7.98	40.9 [296]				
	7.8	40 [167]				

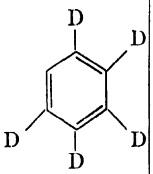
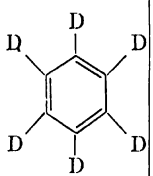
The notes designated by letters are shown on pages 37 and 38.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}	Additional Data
Benzene (*Continued*)	7	40[15]	0.89262	7°[45]		
	7.47	39.85[296]	0.8917	6.7°[348]		
	7.4	39[167]	0.89370	6.06°[103]		
	7.03	38.45[296]	0.89451	5.6°[194]		
	6.9	38[167]	0.8928	5.4°[348]		
	6.25	37.2[296]	0.89473	5°[103]		
	6.4	37[167]	0.89502	5°[2]		
	5.74	36.15[296]	0.8949	D_5^{5}[273]		
	5.9	36[167]	0.88811	4.96°[98]		
	5.48	35.9[296]	1.00619 (solid)	4°[98]		
	5.31	35.4[296]	1.00707 (solid)	3°[98]		
	5.06	35.2[296]	0.8979	2.0°[115]		
	5.30	35.05[296]	1.00863 (solid)	2°[98]		
	5.4	35[167]	0.89985	0.15°[350]		
	5.0	34.7[157]	0.9000	0.15°[236]		
	4.84	34.7[296]	0.8988(g)	0°[348]		
	4.9	34[167]	0.89888	0°[119]		
	4.4	33[167]	0.89938	0°[103]		
	4	31.5[59]	0.89944	0°[45]		
	3.13	31.15[296]	0.899487	0°[280,281]		
	3.08	30.95[296]	0.8997	0°[304]		
	2.03	29.15[296]	0.89990	0°[222]		
	1.23	28.15[296]	0.89993	0°[40]		
	0.98	27.9[296]	0.89996	0°[350]		
	0.0	26.8(w)[319]	0.90000	0°[405]		
	−0.02	26.8[296]	0.90006	0°[373,402,404]		
	0	26.51[25]	0.90009	0°[365]		
	0.0	26.5[157]	0.90023	0°[2]		
	−0.97	25.1[296]	0.978 (solid)	0°[247]		
	0.0	25[15]	1.01084 (solid)	0°[98]		
	−1.84	24.0[296]	1.0126 ±0.0011	0°[312]		
	−1.0	23.6[59]	1.0151	0°[299]		
	−5	17.4[59]	1.0235	−8.6°[133]		
	−10	14.83[25,140]	0.985 (solid)	−20°[247]		
	−14	9.2[59]	1.0519	−22°[55]		
	−19	6.5[59]	1.099	−70°[55]		
	−48.8	0.361[368]	1.062	−79°[38]		
	−52.4	0.247[368]	1.101 (y)	−183°[38]		
	−56.0	0.173[368]				
	−77.5	0.0151[25]				

The notes designated by letters are shown on pages 37 and 38.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Monodeuterobenzene 				
5.5 [150]	79.60 [195]			
1,2-Dideuterobenzene 				
	79.95 [195]			
1,3-Dideuterobenzene 				
	79.75 [195]			
1,4-Dideuterobenzene 				
	79.70 [195]			
1,2,3-Trideuterobenzene 				
	79.80 [195]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,4-Trideuterobenzene 	79.85 [195]			
1,3,5-Trideuterobenzene 	79.55 [195]			
1,2,3,4-Tetradeuterobenzene 	79.60 [195]			
1,2,3,5-Tetradeuterobenzene 	79.65 [195]			
1,2,4,5-Tetradeuterobenzene 	79.60 [195]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Pentadeuterobenzene 	79.60 [195]			
Hexadeuterobenzene 	**79.3**			
6.8 [88,89,156,157,395]	79.4 [89]	0.9465 [89]	1.4997 [89]	
6.62 [176]	79.3 [157]	0.94829 [176]	1.49779 22° [157]	
6.5 [1]	80.0 773.6 [157]	0.954 [63]		
	78.5 740 [88]	0.9417 25° [47]		
	75.0 659.5 [157]	0.9429 25° [157]		
	70.0 562.0 [157]	0.9404 D_{25}^{25} [1]		
	65.0 473.8 [157]	0.94560 D_{25}^{25} [157]		
	60.0 399.4 [157]	0.954 ± 0.0005 17° [67]		
	55.0 332.5 [157]			
	50.0 276.7 [157]			
	45.0 227.1 [157]			
	40.0 186.3 [157]			
	35.0 150.7 [157]			
	30.0 121.8 [157]			
	25.0 96.9 [157]			
	20.0 77.1 [157]			
	15.0 60.1 [157]			
	10.0 45.9 [157]			
	5.0 35.9 [157]			
	0.0 27.5 [157]			

Additional Data

* $\frac{1}{T_b} = 0.004513756 - 0.000582066 \log_{10} p_{mm}$ (120 to 775 mm)

† $\frac{1}{T_b} = 0.004463126 - 0.000558222 \log_{10} p_{mm}$ (25 to 125 mm)

(a) This melting point is the average of two or more determinations.

(b) The melting point 5.5 is found in references 1, 41, 73, 88, 89, 153, 171, 175, 193, 226, 230, 259, 289, 312, 330, 336, 377.

(c) This figure is given as a freezing point in the literature.

(d) The boiling point 80.5 is found in references 48, 67, 134, 151, 161, 187, 207, 225, 269.
(e) The boiling point 80.4 is found in references 11, 108, 110, 144, 192, 367, 374, 380.
(f) The boiling point 80.3 is found in references 21, 22, 121, 165, 167, 273, 321, 322, 323.
(g) This density is the average of two or more determinations.
(h) This refractive index is the average of two or more determinations.
(i) The melting point 5.4 is found in references 19, 20, 25, 49, 81, 139, 183, 208, 210, 265, 266, 285, 311, 329, 356, 367.
(j) The boiling point 80.2 is found in references 32, 69, 79, 86, 132, 198, 227, 249, 343, 404, 405.
(k) This boiling point is the average of two or more determinations.
(l) The boiling point 80.1 is found in references 3, 46, 92, 125, 127, 131, 135, 205, 226, 336, 337, 351, 352, 364.
(m) This refractive index was determined on the vapor.
(n) This sample was dried 10 years over phosphoric oxide. The same material dried one month melted at 5.4.
(o) The boiling point 80.0 is found in references 13, 59, 87, 109, 139, 199, 242, 251, 252, 286.
(p) The boiling point 80 appears very frequently in the literature. Most of the references were excluded because the determinations seemed to be only approximations.
(q) This sample was dried 8 years and 8 months over phosphoric oxide. This sample originally boiled at 80.
(r) This sample was dried 8 years and 6 months over phosphoric oxide. This sample originally boiled at 80.
(s) This sample was dried 3 years. This sample originally boiled at 79.6.
(t) This sample was dried for 10 years over phosphoric oxide.
(u) This sample was especially dried over phosphoric oxide.
(v) These samples were especially dried over sodium and potassium.
(w) This pressure is an average of two or more determinations.
(x) Refractive indices of other lines may be found in references 44, 71, 112, 113, 115, 169, 255, 275, 307.
(y) Densities at various pressures are found in references 59, 256.

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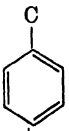
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Toluene (Methylbenzene) 				
−95.18	**110.56**	**0.86650**	**1.49624**	Crit. Temp. (°C)
−93 [139,177]	111.0 [78,168]	0.8648 [29]	1.4947 [55]	321 [106]
−93.5 [39]	110.9 [234]	0.8649 [179]	1.4949 [65]	320.9 [51]
−93.7 [30]	110.8–110.9 [237]	0.86502 [163]	1.4951 [6]	320 8 [72]
−94 [19]	110.6–110 9 [101]	0.86516 [68]	1.4955 [127,136]	320.6 [1,70,104,137]
−94.2 [71]	110.80 [43,218]	0.8652 [55]	1.49552 [22,167]	
−94.5 [132,213]	110.80 ± 0.02	0.8654 [20]	1.4958 [80,109]	320.5 [75,233]
−95.0−−94.5 [99]	760 ± 10 [217]	0.86549 [248]	1.49606 [229]	319.5 [63]
−94.6 [86]	110.8 [32,39,62,90,144,169,206,236]	0.86550 [248]	1.49613 [208]	318.1(f) [145]
−95.0 [146,167,214,216,217]		0.8656 [22,226]	1.4962 [56,144,206,223]	
−95 [37,56,115,140,215]	110.60–110.80 [244,245]	0.8657 [223]	1.49630 [182]	Crit. Pressure (mm Hg)
−95.1 [131,135,206,220]	110 4–110.8 [83]	0 8658 [178]	1.4964 [81]	
−95.143 ± 0.005 [219]	110.3–110.8 [167]	0.86590 [16]	1.49647 [103]	
−95.15 [95,205]	110.75 [112]	0 8659 [21,194]	1.4965 [85,171]	31,616.0 [1,104,106]
−95.2 [251]	110.74 [67]	0.86597 [17]	1.4966 [21,236]	
−95.7−−95.4 [143]	110 72 ± 0.01 [10]	0.8660 [40,81]	1.49675 [133]	31,593.2 [1]
−95.70 [97]	110.70 ± 0.01 [212,219]	0.86604 [109]	1.49692 [200]	
−95.7 [142,152]	110.70 [64,220]	0 86606 [208]	1.4971 [93,207]	Crit. Density
−97 [162]	110.7 [38,47,104,137,200,213]	0.8661 [15,69,133,181]	1.49712 [143]	
	110.65–110.70 [133]	0.8663 [85]	1.00209(c) [84]	0.304 [223]
	110.6–110.7 [169,200]	0.8665 [200]	1.45639 90.35° [164]	0.296 [63]
	110.5–110.7 [241]	0.86697 [167,252]	1.48839 35° [130]	
	110.62 [52]	0.8670 [4]	1.49178 30° [41]	
	110.615(a) [126]	0.8677 [236]	1.4912 27° [154]	
	110.612–110.614 [208]	0.7025 169.4° [147]	1.4917 26.3° [7]	
	110.606 [252]	0.7166 159.2° [147]	1.49323 25.4° [186]	
	110.6(b)	0.7286 150.0° [147]	1.49255 25.2° [42]	
	110.5–110.6 [242,243]	0.7414 140.0° [147]	1.4924 25° [7]	
	110.4–110.6 [187]	0.7535 132.5° [172]	1.49337 25° [186]	
	110.2–110.6 [183]	0.7533 129.9° [147]	1.49365 25° [130]	
	110.56 ± 0.03 [96]	0 76217 126.85° [131]	1.49366 25° [231]	
	110.50 [249]		1.49375 25° [129,239]	
	110.50 ± 0.05 [182]	0.7650 120.2° [147]	1.4938 25° [238]	
	110.5(c)	0.77694 110.8° [156]	1.49653 19.9° [229]	
	110.4–110.5 [157]	0.7767 110.1° [147]	1.4964 19.4° [209]	
	110.4 [21,61,74,92,150]	0.7780 109.8° [191]	1.49750 17° [89]	
	110.4 ± 0 2 [55]	0.77807 109.2° [190]	1.49782 16.35° [228]	
	110.3 [14,54,107,120,184,189]	0.7811 105.17° [148,149]	1.49811 16.13° [48]	
	110.2–110.3 [153]		1.4978 16° [89]	
	110.2 [151]	0.7823 104.0° [235]	1.4989 15.7° [100]	
	110.0 [113]	0.78963 100.25° [131]	1.49894 15.2° [198]	
			1.4988 15° [89]	

The notes designated by letters are shown on page 54.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
Toluene (Methylbenzene) (*Continued*)	110(d) [18,26,79,108,132,138,192]		0.7878	100.0° [147]	1.49985	15° [41,218]	*
			0.7931	100° [121]	1.4992	14.7° [110]	
	109.5–110 [109]		0.7873	99.19° [148,149]	1.50236	10.7° [164]	
	109.5 ± 0.1 [45]				1.50349	8.5° [166]	
	320 6	31,616.0 [38]	0.7895	99.17° [225]	1.50261	8.18° [48]	
	320.0	31,525 [104]	0.7874	99.01° [148,149]	1.50264	7.0° [229]	†
	300	25,399 [230]			1.50496	4.9° [229]	
	301.5	24,624 [104]	0.7939	92.15° [235]	1.45231	$n_{H\alpha}^{90.35}$ [164]	
	295	23,375.18 [66]	0.79949	90 35° [164]	1.48725	$n_{H\alpha}^{30}$ [41]	
	280	19,768 [230]	0.7981	90.3° [117]	1.49111	$n_{H\alpha}^{20}$ [22]	
	283.0	19,760 [104]	0.8004	90° [69]			‡
	280.0	19,076 [104]	0.8002	86.14° [148,149]	1.49365	$n_{H\alpha}^{16.35}$ [228]	
	279.5	18,856 [104]			1.49510	$n_{H\alpha}^{15}$ [218]	
	264.0	16,256.4 [38,104]	0.8084	80.1° [147]	1.49516	$n_{H\alpha}^{15}$ [41]	
			0.8089	80° [226]	1.49428	$n_{H\alpha}^{14.95}$ [48]	
	260	15,086 [230]	0.81017	80.00° [131]	1.4944	$n_{H\alpha}^{14.7}$ [110]	§
	253.5	13,269 [104]	0.8113	80° [121]	1.49785	$n_{H\alpha}^{10.7}$ [164]	
	253	13,189.32 [66]	0.8095	79.73° [225]	1.49891	$n_{H\alpha}^{8.5}$ [166]	
	250.0	12,958 [104]	0.8101	79.24° [225]	1.49309	$n_{H\alpha}^{8.03}$ [48]	
	246.0	12,160 [104]	0.8080	78.4° [172]	1.46694	$n_{H\beta}^{90.35}$ [164]	¶
	240	11,271 [230]	0.8084	77.8° [235]	1.50348	$n_{H\beta}^{30}$ [41]	
	234.5	10,070 [104]	0 8096	75° [4]	1.5002	$n_{H\beta}^{24.1}$ [60]	
	227	9,050.13 [66]	0.8154	75° [77]	1.50700	$n_{H\beta}^{20}$ [22]	
	226 0	9,028.8 [104]	0.8163	73.05° [225]	1.5080	$n_{H\beta}^{19.4}$ [209]	⊙
	220	8,223 [230]	0.8136	72.46° [148,149]	1.50967	$n_{H\beta}^{16.35}$ [228]	
	214.4	7,516.4 [38,104]	0.8149	71.13° [148,149]	1.51130	$n_{H\beta}^{15}$ [41]	
	203.5	6,277.6 [104]	0.8158	70.3° [25]	1.51134	$n_{H\beta}^{15}$ [218]	
	200	5,844 [230]	0.8188	70° [223]	1.5104	$n_{H\beta}^{14.7}$ [110]	⊖
	194.0	5,304.8 [104]	0.8193	70° [69]	1.51047	$n_{H\beta}^{10.7}$ [164]	
	186.5	4,651.2 [104]	0.8215	70.0° [106]	1.51528	$n_{H\beta}^{8.5}$ [166]	
	180	4,028 [230]	0.8184	69.9° [147]			
	175.5	3,936.8 [104]	0.8206	65.3° [235]			
	161.0	2,926.0 [104]					

Additional Data

* $\frac{1}{T_b} = 0.004109562 - 0.00051697 \log_{10} p_{mm}$ (16 to 200 mm)

† $\frac{1}{T_b} = 0.004165504 - 0.00054133 \log_{10} p_{mm}$ (200 to 800 mm)

‡ $\frac{1}{T_b} = 0.004216944 - 0.00055902 \log_{10} p_{mm}$ (800 to 4,000 mm)

§ $\frac{1}{T_b} = 0.00433986 - 0.0005907 \log_{10} p_{mm}$ (4,000 to 32,000 mm)

¶ $\frac{dD}{dt} = -0.000938099[1 + 0.00096907(t - 20)]/°C$ (−20 to 135°C)

⊙ $\frac{dD}{dt} = -0.00093744/°C$ (5 to 40°C)

⊖ $\frac{dn}{dt} = -0.00056541/°C$ (5 to 90°C)

The notes designated by letters are given on page 54.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
Toluene (Methylbenzene) (*Continued*)	160	2,683 [230]	0.8271	60.2° [25]	1.51697	$n_{H\gamma}^{20}$ [22]	
	155.656	2,347.4 [252]	0.8278	60.1° [147]	1.51970	$n_{H\gamma}^{16.35}$ [228]	
	155	2,315 [250]	0.8258	60.04° [148, 149]	1.52139	$n_{H\gamma}^{15}$ [218]	
	149.5	2,128.0 [104]			1.5203	$n_{H\gamma}^{14.7}$ [110]	
	150	2,072 [250]	0.8251	60° [4]	1.52523	$n_{H\gamma}^{8.5}$ [166]	
	149.089	2,026.3 [252]	0.8284	60° [223,226]	1.49624	n_{He}^{20} [49]	
	145	1,849 [250]	0.82922	60° [63]	1.49995	n_{He}^{15} [218]	
	143	1,744 [26]	0.8293	60.0° [106]	(h)		
	142.563	1,741.0 [252]	0.8295	60° [218]			
	140	1,718 [230]	0.8296	60° [121]			
	140	1,646 [250]	0.8263	59.2° [145]			
	136	1,491 [26]	0.8288	56.84° [148]			
	136.082	1,489.2 [252]	0.83280	56.40° [131]			
	135	1,459 [250]	0.83367	52.1° [173]			
	129.5	1,276.8 [104]	0.8371	50.2° [147]			
	130	1,269 [26,250]	0.8393	50.13° [225]			
	129.646	1,268.1 [252]	0.8361	50.1° [25]			
	125	1,135 [250]	0.8338	50° [4]			
	123	1,075 [26]	0.8378	50° [223]			
	123.254	1,074.6 [252]	0.8380	50° [69]			
	120	1,052 [230]	0.8382	50° [77]			
	120	992 [250]	0.8393	50.0° [106]			
	120	973 [53,195, 196]	0.83915	49.7° [128]			
			0.8380	46.6° [172]			
	116.908	906.1 [252]	0.84250	46.30° [131]			
	117	906 [26]	0.84265	46.10° [131]			
	112.99	813.5 [250]	0.8404	45.12° [148, 149]			
	111.0	800 [247]					
	111	800 [26]	0.8430	42.24° [148, 149]			
	110.1 –110.6	786 [180]	0.8477	40.5° [106]			
	111.69	783.9 [250]	0.84526	40° [63]			
	111.35	774.7 [250]	0.8469	40.00° [225]			
	111.4	774.4 [235]	0.8470	40° [223,226]			
	111.17	770.2 [250]	0.84730	40° [16]			
	110.4 –110.6	768 [178]	0.8476	40° [121]			
	110.2 –110.6	765 [2]	0.8484	36.0° [145]			
	110.2 –110.4	763 [151]	0.85294	35° [170]			
	110.66	762.4 [250]	0.85338	34.50° [131]			
	110.6	761.2 [172]	0.8520	32.61° [148, 149]			
	110.6	761 [99]	0.85263	31.92° [173]			
	110.5	760.9 [125]	0.8563	30.12° [123]			
	110.8	760.5 [156]	0.8548	30° [170]			
	110.2	760.5 [192]	0.8563	30° [4]			
	109.2	759.7 [30]	0.8566	30° [223]			
	109.8	759.4 [191]	0.8567	30.0° [106]			
			0.8573	30° [69]			
			0.8576	30° [227]			
				30° [41]			

The notes designated by letters are given on page 54.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}	Additional Data
Toluene	110.7		0.85770	30° [218]		
(Methylbenzene)	−110.8	759 [163]	0.8556	28.74° [148, 149]		
(Continued)	110.51	758.4 [250]				
	110.7	758.3 [156]	0.85699	28.65° [163]		
	110.2		0.85806	28.4° [199]		
	−110.8	758 [57]	0.8571	27.1° [235]		
	110.56(a)	758.0 [250]	0.8608	27° [154]		
	110.1	758.0 [118]	0.86073	25.3° [7]		
	110.1	758 [117]	0.8610	25.13° [10]		
	109.8		0.85956(g)	25° [93]		
	−110 1	758 [119]	0.8598	25° [246]		
	110.54	757 [250]	0.85986	25° [93]		
	110.35	756.9 [250]	0.8599	25° [77]		
	110.37		0.86089	25.0° [248]		
	−110.40	756.6 [211]	0.8612	25° [121]		
	110.9	756.5 [6]	0.8614	25° [223]		
	110.3		0.861719	25° [204]		
	−110.4	756 [178]	0.86216	25° [129]		
	110.34	755.7 [250]	0.8622	25° [9,27]		
	110.2	755 [13]	0.86221	25° [239]		
	110.0	755 [49]	0.86228	25.0° [128]		
	109.6		0.86229	25° [130]		
	−110.0	754 [20]	0.8623	25° [222]		
	110.2	753.7 [221]	0.8625	25° [202]		
	110	753 [80]	0.86288	25° [119]		
	108.8	753 [160]	0.8639	D_{25}^{25} [44]		
	109.98	752.6 [175]	0.86114	24.15° [163]		
	110.25	751.7 [250]	0.86314	22.5° [248]		
	109.43	751.3 ±0.2 [186]	0.8652	22° [203]		
	110.4	750.00 [8]	0.8627	21.2° [235]		
	109.5		0.8640	21.0° [106]		
	−109.8	750 [93]	0.8667	20.9° [42]		
	109.59	750 [185]	0.86542	20.4° [110]		
	108.8	750 [247]	0.86687	D_{20}^{20} [87]		
	110.15	749.05 [250]	0.8669	D_{20}^{20} [80]		
	110.11	749 [202]				
	110.3	748 [12]	0.8684	D_{20}^{20} [165]		
	110.05	747.7 [250]	0.86525	19.75° [163]		
	110.1	746.2 [156]	0.8692	19.0° [36]		
	110.1	745.3 [156]	0.86616	18.77° [163]		
	109.3	744 [93]	0.8653	18.43° [148, 149]		
	108.92	743.7 ± 2 [186]	0.86747	18.2° [110]		
	109.4	743 [34]	0.8657	18° [100]		
	109.3		0.8679	18.0° [48,197]		
	−109.6	742 [25]	0.8685	18° [5,94]		
	109.7	741.7 [159]	0.86574	17.9° [173]		
	110–110.1	740.9 [22]	0.86773	17.5° [248]		
	109.5	740 [134]	0.86774	17.5° [248]		
	110	738 [155]				

The notes designated by letters are given on page 54.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}	Additional Data
Toluene	109.4		0.8659	17° [232]		
(Methylbenzene)	−109.45	733 [33]	0.8684	16.36° [228]		
(*Continued*)	109.24	731.9 [25C]	0.86919	16.33° [110]		
	109.5		0.86931	16.2° [110]		
	−109.6	731 [158]	0.8675	16.04° [148, 149]		
	109.0					
	−109.1	728 [174]	0.8694	16° [82]		
	106.2	714.34 [188]	0.86983	15.6° [110]		
	107.79	701.2 [250]	0.8714	15.5° [89]		
	107.8	700.00 [8]	0.8720	$D_{15.5}^{15.5}$ [90]		
	106.4	700 [247]	0.8702	15.2° [108]		
	105.26	651.9 [250]				
	105.3	650.00 [8]	0.8682	$D_{15.2}^{15.2}$ [172]		
	103.9	650 [247]	0.8693	15° [55]		
	103.349	633.90 [252]	0.87005	15° [248]		
	103	633.7 [26]	0.8704	15° [223]		
	103.0	608.6 [156]	0.8706	15° [121]		
	102.6	603.7 [156]	0.8712	15° [122]		
	102.5	600.00 [8]	0.8713	15° [114]		
	101.3	600 [247]	0.8715	15° [41]		
	102.17	595.1 [250]	0.87160	15° [218]		
	101.55	586 [31]	0.8723	15° [165]		
	100	571 [53,195, 196]	0.8723	D_{15}^{15} [3]		
			0.8704	14.98° [225]		
	99.4	550.00 [8]	0.87155	14.95° [131]		
	98.5	550 [247]	0.87103	14.3° [110]		
	99.01	540.4 [250]	0.8692	14.13° [148, 149]		
	98.137	525.76 [252]				
	97	525.4 [26]	0.8711	14° [154]		
	96.5	500.00 [8]	0.87131	14° [88]		
	95.5	500 [247]	0.8708	13.1° [190]		
	96.22	496.4 [250]	0.8703	13° [210]		
	93.4	454.1 [156]	0.8723	12.87° [224]		
	93.4	451.3 [156]				
	93.2	450.00 [8]	0.87417	$D_{12.6}^{12.6}$ [161]		
	92.2	450 [247]	0.87228	12.5° [248]		
	93.04	448.8 [250]	0.87278	12.4° [110]		
	91.971	433.6 [252]	0.8722	10.89° [148, 149]		
	90	433 [26]				
	90	416 [195,196]	0.87532	10.7° [164]		
	89.96	406.4 [250]	0.8729	10.17° [148, 149]		
	89.7	400.00 [8]				
	88.6	400 [247]	0.8754	10° [69]		
	86.95	368.35 [250]	0.8762	10° [165]		
	85.849	355.1 [252]	0.87757	8.5° [166]		
	84	354.6 [26]	0.8803	5° [165]		
	85.5	350.00 [8]	0.8812	4° [165]		
	84.6	350 [247]	0.8789	3.59° [148, 149]		
	83.90	332.8 [250]				
	81.5	311.7 [156]				

The notes designated by letters are given on page 54.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}	Additional Data
Toluene (Methylbenzene) *(Continued)*	81.2	306.2 [156]	0.8797	2.77° [148,149]		
	80.9	300.00 [8]				
	80.1	300 [247]	0.88218	0° [149]		
	80	299 [53,195,196]	0.8822	0.00° [148]		
			0.88108	0° [140]		
	80.73	298.9 [250]	0.88412	0.0° [225]		
	79.772	289.1 [252]	0.88445	0° [219,220]		
	77.67	268.55 [250]	0.88446	0° [43]		
	75	252.5 [196]	0.88448			
	75.9	250.00 [8]	± 0.00002	0° [212]		
	75.0	250 [247]	0.88450	0° [16]		
	74.66	241.3 [250]	0.8845	0° [76,176]		
	72.21	220.85 [250]	0.88455	0° [250]		
	70.84	210.25 [250]	0.88456	0° [95]		
	70	210 [196]	0.8847	0° [226]		
	70.18	204.95 [250]	0.8854	0° [27,41]		
	69.69	201.4 [250]	0.88543	0° [43]		
	69.6	200.00 [8]	0.88545	0° [131,218]		
	69.0	200 [247]	0.88547	0.0° [128]		
	63.5	162.2 [156]	0.885482(g)			
	63.3	158.3 [156]	± 0.000003	0° [11]		
	62.0	150.00 [8]	0.89618	−11.70° [221]		
	61.5	150 [247]	0.89830	−13.86° [221]		
	60	148 [53,195]	0.90368	−19.60° [221]		
	60	146.8(i) [196]	0.90480	−21.1° [128]		
			0.90665	22.9° [131]		
	61.2	144.8 [156]	0.91170	28.25° [221]		
	51.8	100.00 [8]	0.91825	−35.17° [221]		
	51.8	100 [92]	0.92491	−42.49° [221]		
	51.6	100 [247]	0.92718	−45.2° [131]		
	50	97.5(i) [196]	0.93423	−52.50° [221]		
			0.94393	−62.73° [221]		
	50	93.5 [201]	0.94467	−63.50° [131]		
	46.7	80 [58]	0.95132	−70.38° [221]		
	45.2	75.00 [8]	0.95986	−79.41° [221]		
	45.2	75 [92]	0.96462	−83.6° [131]		
	43.8	70 [58]	0.96928	−89.27° [221]		
	40	64 [53,195]	0.97541	−95.1° [131]		
	40	63.5(i) [196]	1.053	−186° [84]		
			(j)			
	40	60.3 [201]				
	40.6	60 [58]				
	40.3	60 [92]				
	39.9	59 [92]				
	39.5	58 [92]				
	39.1	57 [92]				
	38.7	56 [92]				
	38.3	55 [92]				
	37.9	54 [92]				
	37.5	53 [92]				

The notes designated by letters are given on page 54.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}	n_D^{20}	Additional Data
Toluene (Methylbenzene) (*Continued*)	37	52 [92]			
	36.7	51 [92]			
	36.8	50 [58]			
	36.3	50.00 [8]			
	36.0	50 [247]			
	35.8	49 [92]			
	35.4	48 [92]			
	34.9	47 [92]			
	34.5	46 [92]			
	34.0	45.00 [9,92]			
	33.5	44 [92]			
	33.1	43 [92]			
	32.6	42 [92]			
	32.1	41 [92]			
	31.6	40.00 [8]			
	31.6	40 [92]			
	30	39.25 [196]			
	31.1	39 [92]			
	30 5	38 [92]			
	30	37.7 [201]			
	30	37 [92]			
	29.4	36 [92]			
	28.8	35.00 [8]			
	28.3	35 [92]			
	28.3	34 [92]			
	27.7	33 [92]			
	27.1	32 [92]			
	26.4	31 [92]			
	25.8	30 [74,92]			
	20	24.75(i) [195]			
	20	24.5 [53]			
	20	22.0 [201]			
	14.8	16.80 [8]			
	14.7	16.80 [75]			
	14.5	14.56 [91]			
	0	6.86(i) [8]			
	−2.75	5.57 [116]			
	−3.5	5.36 [116]			
	−3.7	5.30 [116]			
	−4.35	5.00 [116]			
	−4.4	4.98 [116]			
	−7.2	4.17 [116]			
	−8.7	3.77 [116]			
	−9.7	3.53 [116]			
	−20.30	1.74 [8]			
	−21.0	1.607 (i) [8]			
	−78	0.0058 (i) [8]			

The notes designated by letters are given on page 54.

(a) This boiling point is the average of two determinations.
(b) The boiling point 110.6 is found in references 7, 46, 72, 85, 102, 124, 140, 165, 166, 171, 233.
(c) The boiling point 110.5 is found in references 24, 50, 73, 111, 135, 136, 141, 240.
(d) The boiling point 110 appears frequently in the literature. Most of these references were excluded because the determinations seem to be only approximations.
(e) This refractive index was determined on the vapor.
(f) This temperature is the average of two determinations.
(g) This density is the average of two determinations.
(h) Refractive indices of other lines may be found in references 35, 48, 59, 154, 164, 209.
(i) This pressure is the average of two or more determinations.
(j) Densities at various pressures are found in references 26, 156.

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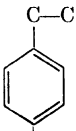
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Ethylbenzene 				
−94.91	**136.06**	**0.86707**	**1.49597**	Crit. Temp. (°C)
−92 [20,58]	136–137 [42]	0.8663 [15]	1.4942 [72]	358.9 [32]
−92.4 [60]	136–136.8 [1]	0.8667 [23]	1.4948 [15]	351.05(f) [70]
−93.0 [17,18]	136.5 [14,56,60,66,88,106]	0.86690 [95,107]	1.4950 [111]	346.4 [2]
−93 [30]	136.3–136.5 [33]	0.8672 [68]	1.4951 [9,86,87]	
−93.2 [53]	135.5–136.5 [10]	0.8674 [33,40]	1.4952 [36]	Crit. Pressure (mm Hg)
−93.9 [94]	135.9–136.3 [61]	0.8678 [29]	1.4955 [104]	
−94 [96]	136.25 [45]	0.8681 [86,87]	1.4958 [29,33]	
−94.2 [52]	136.2 [63,101]	0.8682 [104]	1.4959 [5,14,30]	28,978.80 [2]
−94.4 [95,107]	136.19 [26]	0.8684 [4]	1.49593 [68]	28,956.0 [2,103]
−94.7 [19]	136.18 [113]	0.86875(c) [78]	1.49594 [11]	
−94.96 [14]	136.13–136.18 [81]	0.86995 [55]	1.4960 [19,40,66,98,101]	
−95.1 [39]	136.15 [95,107]	0.7611 135.9° [85]	1.49606 [50,99]	$[\alpha]_{5461}$ = −18.7° [47]
−95.30 [33]	136.15 ± 0.02 [94]	0.7611 135.8° [83,84]	1.49876(d) [100]	
	136.10–136.13 [7]		1.4919 25° [20]	
	136.11 ± 0.01 [8]	0.7612 135.8° [83]	1.4928 25° [71]	
	136.1 [68]	0.77016 125.90° [67]	1.4931 25° [41]	
	136.1 ± 0.5 [29]	0.7935 100.9° [13]	1.49317 25° [107]	
	136.0–136.1 [108]	0.79695 97.60° [67]	1.49386 25° [108]	
	136.07 [112]	0.81373 79.70° [67]	1.4940 25° [51]	
	136.0 [20,30]	0.8302 60.2° [13]	1.4949 25° [69]	
	136(a)	0.83138 59.95° [67]	1.4952 21° [61]	
	136 ± 1 [40]	0.83358 59.5° [70]	1.49594 20.2° [16]	
	135.4–136.0 [38]	0.84412 45.50° [67]	1.4952 18° [114]	
	135–136 [23,28,52,53,98]	0.8489 40.0° [13]	1.49621 18° [90]	
	135.9 [102]	0.8615 30° [4]	1.49730 18° [44]	
	135.86 [93]	0.86301 28.2° [89]	1.49790 17.8° [100]	
	135.8 [84,103,104]	0.86085 26.90° [67]	1.49854 16.02° [22]	
	135.5–135.8 [73]	0.8625 25.13° [8,62]	1.4957 16° [97]	
	135.5–135.7 [74]	0.8603 25° [71]	1.49780 16° [43]	
	135.6 [17,64]	0.8616 25° [21,35]	1.49857 15° [95]	
	135.5 [37,74,75]	0.8624 25° [33]	1.49828 14.5° [98]	
	135.11 [100]	0.8629 25° [69]	1.49933 14.5° [100]	
	141.29 871.5 [113]	0.8630 25° [51]	1.4994 14.5° [55]	
	139.44 829.1 [113]	0.8646 D_{25}^{25} [24]	1.49881 14.3° [100]	
	137.43 786.8 [113]		1.4990 14° [49]	
	137.07 777.9 [113]	0.8650 D_{25}^{25} [20,74]	1.50138 10.63° [22]	
	136.92 774.7 [113]	0.8671 D_{25}^{25} [74]	1.50206 8.4° [75]	
	136–137 770 [3]	0.8639 23.4° [39]	1.50264 7.0° [99]	
	136.35 −136.45(b) 766.7 [78]	0.8664 22.5° [25]	1.49174 $n_{H\alpha}^{20.2}$ [16]	
	136.15 −136.27 766.3 [92]	0.86566 21.0° [70]	1.49058 $n_{H\alpha}^{20}$ [23]	
		0.8684 D_{20}^{20} [36]	1.49169 $n_{H\alpha}^{20}$ [11]	

The notes designated by letters are given on page 62.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Ethylbenzene (*Continued*)	136.5 766 [34]	0.8685 D_{20}^{20} [74]	1.49418 $n_{H\alpha}^{16.12}$ [22]	
	135.98 ±0.02 765 [19]	0.8705 D_{20}^{20} [74]	1.49408 $n_{H\alpha}^{15}$ [95]	
	136.05 −136.10 764.3 [93]	0.87186 17.7° [55]	1.49423 $n_{H\alpha}^{14.5}$ [98]	
	136.37 763.2 [113]	0.8722 D_{17}^{17} [97]	1.4948 $n_{H\alpha}^{14.5}$ [55]	
	135–136 763 [24]	0.87326 16.0° [55]	1.49694 $n_{H\alpha}^{10.86}$ [22]	
	135.5 −135.8 763 [80]	0.87367 15.6° [55]	1.49781 $n_{H\alpha}^{8.4}$ [75]	
	136.24 762.7 [113]	0.8722 15° [29]	1.50693 $n_{H\beta}^{20.2}$ [16]	
	136 762 [49]	0.87426 15° [67]	1.50565 $n_{H\beta}^{20}$ [23]	
	136.03 761.1 [76]	0.8720 D_{15}^{15} [71]	1.50693 $n_{H\beta}^{20}$ [11]	
	136.09 759.0 [113]	0.8741 D_{15}^{15} [71]	1.50950 $n_{H\beta}^{15}$ [95]	
	135.7 −135.9 758.5 [83]	0.87152 14.85° [67]	1.50953 $n_{H\beta}^{14.5}$ [98]	
	135.5 −135.7 756 [39]	0.87452 14.6° [55]	1.5102 $n_{H\beta}^{14.5}$ [55]	
	135.7 −135.9 755.2 [65]	0.8708 14.5° [98]	1.51316 $n_{H\beta}^{8.4}$ [75]	
	135.62 750.2 [112]	0.87494 14.1° [55]	1.51500 $n_{H\gamma}^{20}$ [23]	
	134.8 −135.2 747 [48]	0.8736 14° [49]	1.51637 $n_{H\gamma}^{20}$ [11]	
	135–136 746.5 [11]	0.87545 13.5° [55]	1.51904 $n_{H\gamma}^{14.5}$ [98]	
	135.7 −135.95(b) 745.5 [46]	0.8759 D_{10}^{10} [74]	1.5196 $n_{H\gamma}^{14.5}$ [55]	
	134.2–135 741 [36]	0.8780 D_{10}^{10} [74]	1.52279 $n_{H\gamma}^{8.4}$ [75]	
	135.1 −135.3 740 [13]	0.8760 9.9° [83]	1.49477 n_{He}^{20} [23]	
	135.20 739.1 [113]	0.87704 8.5° [95]	1.49868 n_{He}^{15} [95]	
	133.5 −134.5 730 [114]	0.87697 8.4° [75]	(c)	
	133–134 725 [109]	0.8800 D_5^5 [74]		
	134.36 724.4 [113]	0.8821 D_5^5 [74]		
	132.24 684.8 [113]	0.8809 D_4^4 [74]		
	130.32 648.6 [113]	0.8829 D_4^4 [74]		
	127.30 596.5 [113]	0.88316 0° [106]		
	124.25 546.6 [113]	0.8832 0° [93]		
	121.06 499.3 [113]	0.88452 0° [95]		
	118.08 456.8 [113]	0.88457 0° [113]		
	115.12 417.45 [113]	0.88458 0° [67]		
	112.13 381.0 [113]	0.8855 0° [79]		
		0.90464 −22.9° [67]		
		0.92415 −45.2° [67]		
		0.95798 −83.6° [67]		
		0.96809 −95.1° [67]		

Additional Data

* $\frac{1}{T_b} = 0.00388409 - 0.000500 \log_{10} p_{mm}$ (100 to 875 mm)

† $\frac{dD}{dt} = -0.00089175[1 + 0.0003948(t - 20)]/°C$ (−95 to 136°C)

‡ $\frac{dn}{dt} = -0.00051701/°C$ (7 to 25°C)

The notes designated by letters are given on page 62.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}	n_D^{20}	Additional Data
Ethylbenzene (*Continued*)	109.11	346.9 [113]			
	105.98	313.65 [113]			
	102.93	284.15 [113]			
	99.90	257.15 [113]			
	96.86	231.85 [113]			
	93.96	209.45 [113]			
	90.87	188.05 [113]			
	87.80	168.15 [113]			
	84.74	150.65 [113]			
	81.60	134.3 [113]			
	79.52	123.95 [113]			
	78.93	121.2 [113]			
	25	21 [27]			
	30	10 [49]			
	−1.38	1.38 [59]			
	−11.6	0.56 [59]			

(a) The boiling point 136 is found in references 6, 12, 31, 54, 77, 82, 91, 105, 110, 111.
(b) This boiling point is the average of two or more determinations.
(c) This density is the average of two or more determinations.
(d) This refractive index is the average of two or more determinations.
(e) Refractive indices of other lines may be found in reference 22.
(f) This temperature is the average of two or more determinations.

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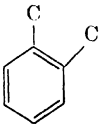
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
o-Xylene (1,2-Dimethylbenzene)				
−25.25	**144.18**	**0.88009**	**1.50516**	Crit. Temp. (°C)
−25.0 ± 0.1 [44]	144.7 [10]	0.87810 [21]	1.5040 [66]	363 [30]
−25.0 [12]	144.6 [48]	0.8793 [24,47]	1.5045 [26]	362.95(a) [7]
−25 [34]	144.5 [9,27,54]	0.8799 [38]	1.5049 [66]	359.05(a) [46]
−25.10 [13]	144.42 [16]	0.880024 [51]	1.5053 [20]	358.3 [42]
−25.30 [9,20,69]	144.4 [20,36,69]	0.88011 [44]	1.50538 [67]	357.7 [25]
−25.3 [41]	143.7–144.2 [45]	0.88012 [44]	1.5054 [9]	
−25.34 ± 0.1 [57]	143.95–144.15 [44]	0.88040 [9,69]	1.5055 [13,38]	Crit. Pressure (mm Hg)
−25.5 [63]	144.0–144.1 [61]	0.8809 [20]	1.5057 [66]	
−25.74 [49]	144.0 [3,17,28,41]	0.8811 [23,59]	1.5058 [17,72]	
−27 [4,17]	144.0 ± 0.3 [65]	0.8812 [60]	1.5061 [72]	28,066.80 [1]
atm	144 [23,31]	0.76429 154.90° [39]	1.50301 25° [69]	28,044.0 [1,36]
0.00 1,045 [12]	143.7 [70]	0.78782 126.00° [39]	1.5030 25° [57]	
−5.0 837 [12]	143.6 [33]	0.80573 106.05° [39]	1.50294 24.5° [8]	
−8.6 692 [12]	143.2–143.6 [71]	0.82945 79.45° [39]	1.5042 22.3° [11]	
−10.0 633 [12]	143.4 [15]	0.8461 60.80° [59]	1.50463 21.6° [8,67]	
−15.0 423 [12]	142.1–143.1 [53]	0.84558 60.47° [39]	1.5060 19° [73]	
−20.0 213 [12]	143.0 [62]	0.8432 59.4° [46]	1.50491 17.9° [66]	
	143 [32]	0.8500 56.5° [30]	1.50712 16.57° [44]	
	142.8–143 [19]	0.8582 47.0° [30]	1.50721 16.57° [44]	
	142.6–142.8 [40]	0.85765 46.40° [39]	1.50664 16.1° [66]	
	142.6–142.7 [29]	0.8661 37.2° [30]	1.50777 15.5° [66]	
	144.4	0.866286 36.34° [51]	1.5070 15° [45]	
	−144.7 769 [43]	0.8689 34.47° [59]	1.5082 14.1° [32]	
	144.35 766.2 [64]	0.87180 29.70° [39]	1.51086 9.27° [44]	
	144.07	0.872521 28.93° [51]	1.51136 8.5° [54]	
	−144.08 765 [13]	0.87445 27° [69]	1.49849 $n_{H\alpha}^{24.5}$ [8]	
	143	0.87464 27.0° [62]	1.5000 $n_{H\alpha}^{22.3}$ [11]	
	−143.5 764 [72]	0.8753 26.0° [30]	1.50021 $n_{H\alpha}^{21.6}$ [8]	
	143.9	0.8759 25° [20]	1.50090 $n_{H\alpha}^{17.9}$ [66]	
	−144.2 763 [58,59,60]	0.8752 D_{25}^{25} [53]	1.50273 $n_{H\alpha}^{16.54}$ [44]	
	144 763 [22]	0.8755 24.5° [8]	1.50268 $n_{H\alpha}^{16.51}$ [44]	
	144.00	0.8758 24.1° [18,55]	1.50248 $n_{H\alpha}^{16.1}$ [66]	
	−144.08 759.1 [64]	0.8731 23.85° [46]	1.50368 $n_{H\alpha}^{15.5}$ [66]	
	143.75	0.877938 22.44° [51]	1.5040 $n_{H_\alpha}^{14.1}$ [32]	
	−144.02 757.6 [64]	0.8784 21.6° [8]	1.50632 $n_{H\alpha}^{9.26}$ [44]	
	142–143 755 [72]	0.88019 20.3° [32]	1.50687 $n_{H\alpha}^{8.5}$ [54]	
	142	0.8783 D_{20}^{20} [53]	1.5129 $n_{H\beta}^{24.1}$ [18,55]	
	−143.5 752 [26]	0.8808 D_{20}^{20} [26]	1.5159 $n_{H\beta}^{22.3}$ [11]	
	143–144 751.9 [8]	0.880776 19.12° [51]	1.51602 $n_{H\beta}^{21.6}$ [8]	
	143.7	0.88192 18.2° [32]		
	−143.9 751.6 [37]			
	143.2 750 [70]			

The notes designated by letters are given on page 66.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}		n_D^{20}		Additional Data
o-Xylene (1,2-Dimethylbenzene) (*Continued*)	142	0.8798	17.9° [66]	1.51668	$n_{H\beta}^{17.9}$ [66]	*
	−142.5 750 [2]	0.8825	16.1° [66]	1.51846	$n_{H\beta}^{16.1}$ [66]	
	142.5 748.7 [38]	0.8834	16° [63]	1.51960	$n_{H\beta}^{15.5}$ [66]	
	142–143 746.8 [8]	0.88381	15.9° [32]	1.5200	$n_{H\beta}^{14.1}$ [32]	
	141.1 737.2 [50]	0.8837	15.5° [66]	1.52291	$n_{H\beta}^{8.5}$ [54]	
	140.6 700 [70]	0.88425	15.00° [39]	1.52406	$n_{H\gamma}^{24.5}$ [8]	
	137.8 650 [70]	0.8845	15° [45]	1.52578	$n_{H\gamma}^{21.6}$ [8]	†
	134.8 600 [70]	0.8818	D_{15}^{15} [53]	1.52659	$n_{H\gamma}^{17.9}$ [66]	
	133.9 597.3 [50]	0.88491	14.5° [32]	1.52839	$n_{H\gamma}^{16.54}$ [44]	
	131.7 550 [70]	0.88524	14.1° [32]	1.52847	$n_{H\gamma}^{16.54}$ [44]	
	128.3 500 [70]	0.88573	13.5° [32]	1.52838	$n_{H\gamma}^{16.1}$ [66]	
	124.6 450 [70]	0.88584	13.3° [32]	1.52958	$n_{H\gamma}^{15.5}$ [66]	
	123.8 445(b) [50]	0.8854	D_{10}^{10} [53]	1.5300	$n_{H\gamma}^{14.1}$ [32]	‡
	120.6 400 [70]	0.8899	8.5° [54]	1.53221	$n_{H\gamma}^{9.26}$ [44]	
	116.0 350 [70]	0.8895	D_5^5 [53]	1.53301	$n_{H\gamma}^{8.5}$ [54]	
	112.9 308.4 [50]	0.8903	D_4^4 [53]	1.50506(d)	n_{He}^{20} [14]	
	112.7 306.7 [50]	0.89679	0° [44]	(e)		
	110.9 300 [70]	0.8968	0° [59]			
	105.1 250 [70]	0.89683	0° [44]			
	98.0 200 [70]	0.89692	0° [39]			§
	90.6 150.2 [50]	0.8932	D_0^0 [56]			
	89.3 150 [70]	0.91595	−22.95° [39]			
	90.4 147.2 [50]	(c)				
	77.6 100 [70]					
	0.6 1.10 [35]					
	−10.7 0.42 [35]					
	−17.0 0.20 [35]					

Additional Data

* $t_m = -25.276_4 + 0.02419\ p_{atm}$ (1 to 1050 atm)

† $\frac{1}{T_b} = 0.003808796 - 0.00049026 \log_{10} p_{mm}$ (100 to 770 mm)

‡ $\frac{dD}{dt} = -0.000844595[1 + 0.000703996(t - 20)]/°C$ (−23 to 155°C)

§ $\frac{dn}{dt} = -0.00054941/°C$ (8 to 25°C)

(a) This temperature is the average of two or more determinations.
(b) This pressure is the average of two determinations.
(c) Densities at various pressures are found in reference 50.
(d) This refractive index is the average of two determinations
(e) Refractive indices of other lines may be found in references 5, 8, 18, 55.

o-Xylene References

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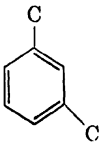
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
***m*-Xylene** (1,3-Dimethylbenzene)				
−47.87	**139.08**	**0.86415**	**1.49717**	Crit. Temp. (°C)
−45.5 [93]	140 [110]	0.8616 [53]	1.4961 [53]	349 [11,43]
−47 [71]	139–140 [1,34]	0.8622 [15]	1.4962 [116]	348.9 [20]
−47.4 [56,98]	139.9 [62]	0.8634 [116]	1.4966 [35]	348.4 [27]
−47.89 [78,111]	139.8 [109]	0.86351 [59]	1.4970 [30,100]	346.35(f) [61]
−48.56 [30]	139.7 [105]	0.8639 [32]	1.4971 [11]	345.6 [2,57]
−48.9 [11]	139.5 [12]	0.86401 [11]	1.49720 [102]	345.5 [106]
−49 [7,64]	139.2–139.5 [68]	0.864053 [70]	1.4972 [114]	344.8 [33]
−50–−49 [59]	139.3–139.4 [55,112]	0.86412 [111]	1.4973 [24,100]	
−49.13 [111]	139.2–139.4 [58]	0.86416 [111]	1.4975 [109]	Crit. Pressure (mm Hg)
−49.3 [12,97]	139.30 [98]	0.8650 [30]	1.49782 [41,102]	
−50.5 [63]	139.3 [28,73,74]	0.8653 [27]	1.49785 [14]	
	139.25–139.30 [59]	0.8655 [10]	1.49788 [55]	27,208.00 [2,43]
	139.2 [11,13,39,58,113]	0.8656 [81]	1.4980 [60]	27,170.00 [2]
	139.15 [111]	0.8657 [55]	1.4946 25° [78]	
	138.99–139.15 [84]	0.8658 [31,82]	1.49467 25° [111]	Crit. Density
	139.11 [23]	0.8661 [109]	1.49468 25° [111]	
	139.1 [36,51]	0.8662 [4]	1.49566 25° [112]	0.290 [106]
	139.00 ± 0.01 [97]	0.74561 154.90° [54]	1.4974 20.2° [94]	0.294 [27]
	139.0 [24,37,48,56,96]	0.75715 139.2°(c) [87,88]	1.4976 19.1° [59]	
	139(a)		1.49830 17.1° [100]	
	138.5–139 [72]	0.75685 139.1° [67]	1.4996 15.7° [47]	
	138.9 [76,92]	0.7571 139° [89]	1.49962 14.85° [100,102]	
	138.5–138.9 [36]	0.7567 $D_0^{138.9}$ [76]		
	137.9–138.9 [60]	0.77172 126.00° [54]	1.50214 11° [44]	
	138.8 [21,91,115]	0.78820 106° [77]	1.50324 8.4° [74]	
	138.75 [47]	0.79476 100.00° [54]	1.50477 5.15° [102]	
	138 [107,108]	0.79449 98.86° [99]	1.49348 $n_{H\alpha}^{20}$ [14]	
	137.5 [100]	0.81293 78.86° [99]	1.49518 $n_{H\alpha}^{20}$ [10]	
	310 18,012 [103]	0.81548 75.92° [99]	1.49429 $n_{H\alpha}^{17.1}$ [100]	
	300 15,930 [103]	0.82021 71° [77]	1.4954 $n_{H\alpha}^{15.7}$ [47]	
	280 12,084 [103]	0.8281 64° [42]	1.49548 $n_{H\alpha}^{14.85}$ [100]	
	260 8,976 [103]	0.8282 64.0° [43]	1.49878 $n_{H\alpha}^{8.4}$ [74]	
	240 6,513 [103]	0.82860 61.15° [54]	1.5079 $n_{H\beta}^{22.5}$ [26,75]	
	220 4,606 [103]	0.8297 60.80° [81]	1.5079 $n_{H\beta}^{20.2}$ [94]	
	200 3,163 [103]	0.8304 59.3° [106]	1.50918 $n_{H\beta}^{20}$ [14]	
	180 2,101 [103]	0.83030 59.28° [99]	1.51099 $n_{H\beta}^{20}$ [10]	
	160 1,344 [103]	0.8367 54.0° [43]	1.51007 $n_{H\beta}^{17.1}$ [100]	
	140.7 800 [115]	0.83689 52° [77]	1.5112 $n_{H\beta}^{15.7}$ [47]	
	139.8–140 766.2 [90]	0.83797 50.54° [99]		
	140 762.6 [106]	0.84140 46.00° [54]		

The notes designated by letters are given on page 71.

M. P., °C	B. P., °C	@ 760mm	D_4^{20}		n_D^{20}		Additional Data
***m*-Xylene** (1,3-Dimethylbenzene) (*Continued*)	139.4	762 [6]	0.8432	44.7° [106]	1.51108	$n_{H\beta}^{15}$ [98]	*
	139.1	761.6 [67]	0.84373	44° [77]	1.51128	$n_{H\beta}^{14.85}$ [100]	
	138.8		0.84484	42.10° [70]	1.51469	$n_{H\beta}^{8.4}$ [74]	
	−139.2	761.2 [81]	0.8478	41.4° [48]	1.52066	$n_{H\gamma}^{20}$ [10]	
	138.8		0.84768	39.37° [99]	1.51997	$n_{H\gamma}^{17.1}$ [100]	
	−139.2	761 [80,82]	0.8531	34.47° [81]	1.5211	$n_{H\gamma}^{15.7}$ [47]	†
	139.2	759.7 [89]	0.85427	31.25° [70]	1.52112	$n_{H\gamma}^{14.85}$ [100]	
	139.2	759.2 [87]	0.85551	30° [93]	1.52462	$n_{H\gamma}^{8.4}$ [74]	
	139	757 [85]	0.8581	30° [4]	1.49702	n_{He}^{20} [19]	
	138.5	756 [44]	0.85611	29.62° [99]	(e)		
	138.3		0.85799	28.4° [91]			
	−139.0	754.5 [70]	0.85817	27° [111]			
	138–139	754 [53]	0.85821	27° [111]			
	138.6		0.8605	26.0° [43]			‡
	−138.8	752 [22]	0.85958	25.15° [54]			
	138–139	750 [35]	0.8600	25° [30]			
	138.3	750 [115]	0.8625	D_{25}^{25} [73]			
	137–138	750 [3]					
	138.7		0.8627	D_{25}^{25} [22]			
	−139.0	748.3 [52]	0.8599	24.9° [61]			§
	137.5		0.8601	24.9° [106]			
	−138	747.5 [116]	0.86039	24.15° [70]			
	137.95		0.86216	22.62° [99]			
	−138.10	744.3 [95]	0.8641	22.5° [26,75]			
	138.1	739.4 [67]	0.86285	21.37° [70]			
	137.9		0.8620	21.1° [16]			¶
	−138.2	735.0 [69]	0.86494	20.2° [47]			
	138.5	725 [18]	0.8653	D_{20}^{20} [35]			
	137.3						
	−137.6	724 [79]	0.8656	D_{20}^{20} [73]			
	136.5		0.8637	$D_{15}^{19.5}$ [17]			
	−137	723 [40]	0.86505	19° [77]			⊙
	135.7	700 [115]	0.86543	18.83° [99]			
	133.0	650 [115]	0.8656	18.4° [106]			
	130.1	600 [115]	0.86650	18.4° [47]			
	129.2	583.6(b) [67]					

Additional Data

* $\frac{1}{T_b} = 0.00382484 - 0.00048565 \log_{10} p_{mm}$ (100 to 800 mm)

† $\frac{1}{T_b} = 0.00395353 - 0.00052578 \log_{10} p_{mm}$ (800 to 18,012 mm)

‡ $\frac{1}{T_b} = 0.00375932 - 0.00044714 \log_{10} p_{mm}$ (0.90 to 100 mm)

§ $\frac{dD}{dt} = -0.00085791[1 + 0.000542(t - 20)]/°C$ (−52 to 155°C)

¶ $\frac{dD}{dt} = -0.00086094/°C$ (0 to 46°C)

⊙ $\frac{dn}{dt} = -0.00051262/°C$ (5 to 25°C)

The notes designated by letters are given on page 71.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}	Additional Data
***m*-Xylene** (1,3-Dimethylbenzene) (*Continued*)	127.0	550 [115]	0.8666	17.2° [100]		
	123.6	500 [115]	0.8667	17.1° [100]		
	121.8	458.3 [67]	0.8678	17° [104]		
	120.1	450 [115]	0.86818	16.4° [47]		
	120.5	449.2 [67]	0.86762	15° [60]		
	116.2	400 [115]	0.86835	15° [98]		
	111.7	350 [115]	0.86950	15° [60]		
	107.0	300 [115]	0.8691	D_{15}^{15} [73]		
	108.7	294.0 [67]	0.86848	14.90° [54]		
	108.3	292.7 [67]	0.8686	14.85° [100]		
	101.4	250 [115]	0.87002	14.2° [47]		
	94.9	200 [115]	0.8715	12.3° [87]		
	89.3	152.2 [67]	0.8702	12° [65]		
	86.9	150 [115]	0.8721	12° [42]		
	88.8	148.2 [67]	0.8728	D_{10}^{10} [73]		
	76.3	100 [115]	0.87397	8.4° [74]		
	59.7	50 [115]	0.8770	D_5^{5} [73]		
	−2.8	1.37 [49]	0.8779	D_4^{4} [73]		
	−6.75	1.03 [49]	0.8796	0° [38]		
	−8.4	0.90 [49]	0.88097	0° [77]		
			0.88113	0° [54,98]		
			0.88151	0° [99]		
			0.8823	0° [81]		
			0.8812	D_0^{0} [76]		
			0.89269	−14° [77]		
			0.90440	−28° [77]		
			0.92148	−48° [77]		
			0.92310	−50° [77]		
			0.92481	−52° [77]		
			0.94876	−70° [77]		
			0.95147	−75° [77]		
			0.9535	−80° [38]		
			1.005	−186° [38,77] (d)		

(a) The boiling point 139 is found in references 5, 29, 31, 45, 46, 50, 57, 86, 101.
(b) This pressure is the average of two determinations.
(c) This density is an average of two determinations.
(d) Densities at various pressures are found in reference 67.
(e) Refractive indices of other lines may be found in references 8, 25, 26, 65, 75, 83, 94, 98.
(f) This temperature is the average of two determinations.

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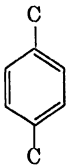
p-Xylene
(1,4-Dimethylbenzene)



M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
13.27	**138.35**	**0.86102**	**1.49583**	Crit. Temp. (°C)
14.5 [49,50]	138.9 [33]	0.8603 [93]	1.4951 [27]	348.9 [18]
14.3 [62]	138.7 [10]	0.8604 [48]	1.4956 [20,28]	348.5 [7,40]
14 [3,56]	138.5–138.6 [22]	0.8609(c) [59]	1.49568(f) [100]	345.3(d) [61]
13–14 [30,31]	138.47–138.52 [58]	0.860908 [73]	1.49573(f) [99]	344.4 [2,54]
13.55 [57]	138.5 [9,38,53 66,75,77,91,103]	0.86094 [58]	1.49577 [52]	343.6 [26]
13.5 [35]	138.3–138.5 [105]	0.86100 [9,97]	1.4958 [9,107]	
13.45 [88]	138.46 [32]	0.8610 [63]	1.4959 [22]	Crit. Pressure (mm Hg)
13.4 [77,93]	138.40 [97]	0.86107 [103]	1.4965 [108]	
13.35 [14,72,97]	138.4 [43,46,52,103]	0.8611 [24,25,85,86,91]	1.49680 [37]	26,600.00 [2,40]
13.30 [58]	138.3–138.4 [104]	0.8616 [52]	1.4968 [48]	26,569.60 [2]
13.25 [36]	138.27–138.37 [87]	0.73906 155.00° [51]	1.49389 25.4° [8]	
13.23 ± 0.05 [80]	138.35 [19]	0.75305(c) 138.4° [69]	1.4931 25° [80]	
13.21 [103]	138–138.2 [74]	0.7543 138° [89]	1.49320 25° [103]	
13.2 [16,29,85,95]	138.1 [106]	0.7558 $D_0^{138.0}$ [79]	1.49396 25° [104]	
13.1–13.2 [86]	138.0 [79,92]	0.76658 125.55° [51]	1.4940 25° [34]	
13.19 [9,68]	138(b)	0.78998 100.00° [51]	1.4942 23.4° [13,91]	
13.15 [10,67]	137.7 [20]	0.80866 79.70° [51]	1.49685 19.9° [37,100]	
13.10 [91]	140.1 800 [106]	0.8228 64° [39]	1.4958 19.7° [94]	
13.1 [53,59,81]	138.4	0.8235 63.0° [40]	1.4968 19.0° [58]	
13.00 [22,82]	−138.7 769 [55]	0.82527 61.05° [51]	1.49682 17.5° [99]	
13.0 [70]	138.37	0.82564 60.60° [51]	1.49747 16.2° [99,100]	
13 [12,20]	−138.67 766.4 [96]	0.8261 60.60° [85]	1.49860 15° [97]	
atm	138.5 765 [23]	0.8350 50.0° [40]	1.4985 14.7° [42]	
99.91 2,855(a) [95]	138.1 761.2 [89]	0.83851 46.00° [51]	1.49911 14.4° [77]	
95.00 2,676(a) [95]	138.4 759.2 [69]	0.84294 40.65° [73]	1.50315 6.5° [100]	
89.98 2,478(a) [95]	137.6 754.3 [90]	0.8444 40° [85]	1.48949 $n_{H\alpha}^{25.4}$ [8]	
85.00 2,308(a) [95]	137.8	0.84767 35.20° [5]	1.4898 $n_{H\alpha}^{23.4}$ [13]	
79.85 2,110(a) [95]	−138.1 754 [83]	0.8489 34.75° [85]	1.49273 $n_{H\alpha}^{17.5}$ [99]	
74.90 1,918(a) [95]	138.0	0.84939 33.30° [73]	1.49346(f) $n_{H\alpha}^{16.2}$ [99]	
69.92 1,744(a) [95]	−138.2 752.2 [47]	0.84943 33.3° [97]	1.49420 $n_{H\alpha}^{15}$ [97]	
64.98 1,584(a) [95]	137.5 750 [106]	0.85121 31.00° [5]	1.4943 $n_{H\alpha}^{14.7}$ [42]	
60.00 1,423(a) [95]	136	0.85230 30° [97]	1.49462 $n_{H\alpha}^{14.4}$ [77]	
54.96 1,253(a) [95]	−136.5 750 [34]	0.85316 29.01° [5]	1.5058 $n_{H\beta}^{23.7}$ [21,78]	
49.95 1,103(a) [95]	137.5	0.85498 27° [103]	1.5055 $n_{H\beta}^{23.4}$ [13]	
46.4 968 [14]	−138 748 [31]	0.85525 27.0° [92]	1.5068 $n_{H\beta}^{19.7}$ [94]	
44.90 954(a) [95]	137.1 737.1 [69]	0.85448 26.58° [5]	1.50849 $n_{H\beta}^{17.5}$ [99]	
45.00 926 [14]	137.1	0.85613 25.50° [73]	1.50919 $n_{H\beta}^{16.2}$ [99]	
39.93 787 [95]	−137.2 730.8 [71]	0.85622 25.5° [97]		
40.00 777 [14]	134.7 700 [106]	0.8564 25.2° [40]		
34.94 634 [95]	131.6 650 [106]			

The notes designated by letters are given on page 77.

M. P., °C		B. P., °C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
p-Xylene (1,4-Dimethylbenzene) (*Continued*)		129.6	600.1 [69]	0.85652	25.12° [51]	1.51000(f)	$n_{H\beta}^{15}$ [97]	*
		129.6	599.6 [69]	0.85665	25.0° [97]	1.5097	$n_{H\beta}^{14.7}$ [42]	
		119.2	445.6(a) [69]	0.8574	25° [34]	1.51050	$n_{H\beta}^{14.4}$ [77]	
		107.1	302.6 [69]	0.8576	25° [22]	1.51481	$n_{H\gamma}^{25.4}$ [8]	
		106.9	295.6 [69]	0.8593	D_{25}^{25} [76]	1.51841	$n_{H\gamma}^{17.5}$ [99]	
35.00	626 [14]	86.9	149.2(a) [69]	0.8595	D_{25}^{25} [1]	1.51905(f)	$n_{H\gamma}^{16.2}$ [99]	
30.15	484 [14]	0.2	1.16 [44]	0.85733	23.37° [5]	1.51285	$n_{H\gamma}^{15}$ [97]	†
30.09	480 [95]	−2.5	0.87 [44]	0.8587	22.90° [85]	1.5200	$n_{H\gamma}^{14.7}$ [42]	
30.00	479 [14]	−9.5	0.33 [44]	0.85925	21.25° [5]	1.52055	$n_{H\gamma}^{14.4}$ [77]	
25.18	346 [95]			0.86112	20.2° [42]	1.49570(f)	n_{He}^{20} [17]	
25.00	332 [14]			0.8616	D_{20}^{20} [27]	1.49860	n_{He}^{15} [97]	
20.13	199 [95]			0.8626	D_{20}^{20} [76]	(g)		
20.00	191 [14]			0.86058	19.74° [5]			‡
15.00	47 [14]			0.86134	19.50° [73]			
				0.86143	19.5° [97]			
				0.8621	19.5° [65]			
				0.86216	19° [42]			
				0.86304	18.1° [42]			
				0.8625	17.5° [99]			
				0.86333	17.23° [5]			§
				0.8627	17.2° [99]			
				0.86343	17.2° [97]			
				0.8636	17.0° [97]			
				0.86388	17° [42]			
				0.8650	D_{15}^{17} [15]			
				0.86412	16.8° [42]			
				0.8641(c)	16.2° [99]			¶
				0.8647	16° [101]			
				0.86542	15.02° [5]			
				0.86535	15.0° [97]			
				0.8656	15° [59]			
				0.8661	D_{15}^{15} [76]			
				0.86544	14.90° [51]			
				0.86590	14.4° [97]			
				0.86619	14.4° [77]			

Additional Data

* $t_m = 13.239 + 0.03570\, p_{atm} - 0.00000191\, p_{atm}^2$ (1 to 2900 atm)

† $\frac{1}{T_b} = 0.00386083 - 0.00049664 \log_{10} p_{mm}$ (100 to 800 mm)

‡ $\frac{dD}{dt} = -0.00086265[1 + 0.000747(t - 20)]/°C$ (0 to 135°C)

§ $\frac{dD}{dt} = -0.00087105/°C$ (10 to 50°C)

¶ $\frac{dn}{dt} = -0.00052667/°C$ (6 to 25°C)

The notes designated by letters are given on page 77.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
p-Xylene (1,4-Dimethylbenzene) (*Continued*)		0.86622 14.3° [42] 0.86751 12.2° [42] 0.8678 12° [39] 0.86865 11.81° [5] 0.8779 0° [85] 0.87848 0° [51] 1.0520 ± 0.0016 0° [88] (e)		

(a) This pressure is the average of two or more determinations.
(b) The boiling point 138 is found in references 4, 11, 12, 41, 42, 45, 49, 50, 60, 64, 84.
(c) This density is the average of two determinations.
(d) This temperature is the average of two determinations.
(e) Densities at various pressures are found in reference 69.
(f) This refractive index is the average of two or more determinations.
(g) Refractive indices of other lines may be found in references 6, 8, 21, 78, 94.

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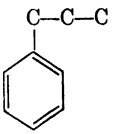
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
n-Propylbenzene 				
	159.2	**0.8621**	**1.4919**	Crit. Temp. (°C)
−99.2 [162]	158.3–160.3 [67]	0.86165(b) [134,142]	1.4919 [39,46]	365.6 [2]
−101.55(d) [160]	160 [5]	0.8617 [143]	1.4920 [169]	365.5 [178]
	159.55 ± 0.05 [160]	0.8622 [52]	1.4921 [52]	
	159–159.5 [121]	0.8628 [39,46]	1.4922 [142,143]	Crit. Pressure (mm Hg)
	159.45 [162]	0.8638 [193]	1.4942 15.7° [86]	24,548.0 [2]
	159.22 [44]	0.7399 158.7° [141]	1.49549 12.25° [169]	24,532.80 [2]
	159 [68,85,109,122,166]	0.7399 158.5° [139,140]	1.49793 8.3° [122]	
	158–159 [9,38,169]		1.49928 5.1° [170]	
	158.9 [88,89]	0.76608 130.00° [103]	1.45321 $n_{H\alpha}^{88.9}$ [41]	Crit. Density
	158.7 [177]		1.48717 $n_{H\alpha}^{21.4}$ [41]	0.277 [178]
	158.6 ± 0.7 [39,46]	0.79423 99.55° [103]	1.48851 $n_{H\alpha}^{20}$ [28]	0.283 [178]
	158.5 [140,146]	0.8032 88.9° [41]	1.4891 $n_{H\alpha}^{15.7}$ [86]	
	157.5–158.5 [188]	0.81482 76.10° [103]	1.49016 $n_{H\alpha}^{15}$ [162]	
	158.3(a) [178]	0.82642 62.75° [103]	1.49176 $n_{H\alpha}^{12.25}$ [169]	
	158.0 [133]	0.84691 38.30° [103]	1.49388 $n_{H\alpha}^{8.3}$ [122]	
	158 [123,175]	0.8541 30° [143]	1.46645 $n_{H\beta}^{88.9}$ [41]	
	156.0 [189]	0.85781 25.6° [145]	1.50154 $n_{H\beta}^{21.4}$ [41]	
	158.5 800 [189]	0.8574 25° [7]	1.50289 $n_{H\beta}^{20}$ [28]	
	157.9–158.2 765 [134]	0.8602 D_{25}^{25} [42]	1.5045 $n_{H\beta}^{15}$ [86]	
	160 763 [157]	0.8603 D_{25}^{25} [121]	1.50478 $n_{H\beta}^{15}$ [162]	
	158–159 763 [42]	0.85966 22.85° [103]	1.50630 $n_{H\beta}^{12.25}$ [169]	
	157.6–159 758.1 [156]	0.8605 21.4° [41]	1.50850 $n_{H\beta}^{8.3}$ [122]	
	158.5 751.6 [139]	0.86228 20.1° [86]	1.5134 $n_{H\gamma}^{15.7}$ [86]	
	158.7 750 [141]	0.8634 D_{20}^{20} [121]	1.51533 $n_{H\gamma}^{12.25}$ [169]	
	155.4 750 [189]	0.86363 18.4° [86]	1.51769 $n_{H\gamma}^{8.3}$ [122]	
	156–158 731 [158]	0.86550 16.1° [86]	(c)	
	152.5(e) 700 [189]	0.86613 15.15° [103]		
	149.4(e) 650 [189]	0.86629 15° [162]		
	146.2(e) 600 [189]	0.8666 15° [39,46]		
	142.8(e) 550 [189]	0.8668 D_{15}^{15} [121]		
	139.1(e) 500 [189]	0.86711 D_{15}^{15} [122]		
	135.1(e) 450 [189]	0.86691 14.4° [86]		
	130.9(e) 400 [189]	0.86788 13.2° [86]		
	126.2(e) 350 [189]	0.8680 13° [71]		
	121.0(e) 300 [189]	0.8681 12.25° [169]		
	115.0(e) 250 [189]	0.8705 D_{10}^{10} [121]		
	107.9(e) 200 [189]	0.8702 9.8° [139]		
	99.1(e) 150 [189]	0.8719 8.3° [122]		
	87.2(e) 100 [189]			
	67.7(e) 50 [189]			

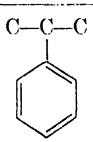
M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}	Additional Data
n-Propylbenzene (*Continued*)	67-68	15 [71]	0.8745	D_5^5 [121]		*
	47-49	11 [143]				
	13.9	1.95 [93]	0.8753	D_4^4 [121]		
	3.6	0.85 [93]	0.87864	0° [103]		
	−0.7	0.58 [93]	0.87919(b)	0° [156]		†
	−6.8	0.35 [93]	0.8792	0° [193]		
			0.89754	−22.9° [103]		
			0.91584	−45.2° [103]		
			0.94830	−83.6° [103]		‡
			0.95737	−95.1° [103]		

$* \frac{dD}{dt} = -0.0008292[1+0.000879(t-20)]/°C$ (−23 to 159°C)

$† \frac{dD}{dt} = -0.0008349/°C$ (0 to 40°C)

$‡ \frac{dn}{dt} = -0.0004956/°C$ (5 to 25°C)

(a) This boiling point is the average of two determinations.
(b) This density is the average of two determinations.
(c) Refractive indices of other lines may be found in reference 162.
(d) This melting point probably refers to the metastable form.
(e) Since 189 is the only reference giving boiling points between 50 and 700 mm, these values were not used in obtaining a boiling-point-pressure equation. The data on other compounds indicates that all boiling points measured at these pressures are too low in this reference.

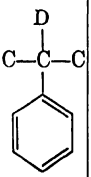
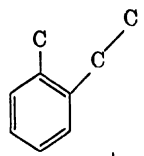
Isopropylbenzene (Cumene) 					
−96.1	**152.4**	**0.8623**		**1.4915**	Crit. Temp. (°C)
−95.2(a) [165]	152.6-153.8 [67]	0.8619 [164]		1.4911 [165]	362.7 [2]
−96.25 [187]	152.2-153.7 [121]	0.8620 [134,165]		1.4912 [155,164]	347.2 [54]
−96.9 [159,161]	153-153.5 [55]	0.86231 [86]		1.4914 [6]	
−97 [166]	152.5-153.5 [77,147,148]	0.8633 [187]		1.49145(d) [149]	Crit. Pressure (mm Hg)
	153.4 [40]	0.8635 [130]		1.4915 [187]	
	152.8-153.4 [169]	0.7424	152° [119]	1.4917 [10]	
	153.0 [145]	0.79324	100° [125,126]	1.49199 [76,170]	24,472.0 [2]
	153(b)	0.81585	75° [125,126]	1.4922 [57]	
	152.5-153 [92]	0.83756	50° [125,126]	1.4883	26° [97]
	152-153 [11,12,59,70,129,150]	0.85659	26.9° [145]	1.4879	25° [150]
		0.85766	25° [148]	1.4883	25° [29]
	152.50-152.55 [161]	0.8580	25° [29]	1.4885	25° [104,115]
	152.5 [102]	0.8581	25° [104,115]	1.4947	15.1° [86]
	151-152.5 [61]	0.85870	25° [125,126]	1.49778	7.9° [122]
	152.40 [44]	0.8603	D_{25}^{25} [121]	1.49885	5.8° [170]
	152.4 [98,136,155]	0.86064	22.0° [86]	1.49063	$n_{Hα}^{16.8}$ [169]
	152.38 [187]			1.4900	$n_{Hα}^{15.1}$ [86]
	151.6-152.2 [97]	0.8634	D_{20}^{20} [121]		

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}		n_D^{20}		Additional Data
Isopropylbenzene (Cumene) (*Continued*)	152.0 [15]	0.86397	18.0° [86]	1.49364	$n_{H\alpha}^{7.9}$ [122]	*
	152 [29,119,166]	0.86576	17.5° [92]	1.50539	$n_{H\beta}^{16.8}$ [169]	
	151–152 [43,78]	0.8662	16.8° [169]	1.5044	$n_{H\beta}^{15.1}$ [86]	
	151.5	0.86556(c)	16.1° [86]	1.50826	$n_{H\beta}^{7.9}$ [122]	
	−152.5 770 [130]	0.86593	15.6° [86]	1.51466	$n_{H\gamma}^{16.8}$ [169]	
	152.85	0.8660	$D_{15.4}^{15.4}$ [55]	1.5134	$n_{H\gamma}^{15.1}$ [86]	
	−153.15 765 [133]	0.8675	15° [182,183]	1.51722	$n_{H\gamma}^{7.9}$ [122]	
	152.6	0.8668	D_{15}^{15} [121]	(e)		
	−152.8 759 [134]	0.8705	D_{10}^{10} [121]			
	152.5 759 [48]	0.8727	7.9° [122]			
	151.9	0.8745	D_5^5 [121]			
	−152.2 758 [57]	0.8753	D_4^4 [121]			
	152.5	0.87798	0° [148]			
	−152.8 751.4 [133]	0.8792	0° [182,183]			
	152.5 750.6 [6]	0.87976	0° [125,126]			
	151–152 744 [164]	0.8791	D_0^0 [77]			
	151 742 [150]					
	149.5					
	−151 730 [158]					
	149–150 718 [176]					
	148.2(f) 650 [189]					
	144.9(f) 600 [189]					
	141.5(f) 550 [189]					
	137.6(f) 500 [189]					
	133.6(f) 450 [189]					
	129.3(f) 400 [189]					
	124.4(f) 350 [189]					
	118.9(f) 300 [189]					
	112.7(f) 250 [189]					
	105.1(f) 200 [189]					
	95.9(f) 150 [189]					
	83.2(f) 100 [189]					
	62.6(f) 50 [189]					
	35.5 10 [194]					
	13.7 2.25 [93]					
	1.3 0.93 [93]					
	−8.2 0.43 [93]					

* $\frac{dD}{dt} = -0.0008365[1+0.0006955(t-20)]/°C$ (0 to 100°C)

† $\frac{dn}{dt} = -0.0005186/°C$ (5 to 26°C)

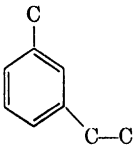
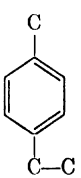
(a) This temperature is recorded as a freezing point in the literature.
(b) The boiling point 153 is found in references 35, 68, 85, 86, 138, 146, 184, 186.
(c) This density is the average of two determinations.
(d) This refractive index is the average of two determinations.
(e) Refractive indices of other lines may be found in reference 50.
(f) Since 189 is the only reference giving boiling point between 50 and 650 mm, these values were not used obtaining a boiling-point-pressure equation. The data on other compounds indicates that all boiling points measured at these pressures are too low in this reference.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Deutero-2-phenylpropane (Isopropylbenzene-d) 				
	151-152 [21] 149-151 [18]			$[\alpha]_D^{25}$ = 0.019° [21]
1-Methyl-2-ethylbenzene 				*
	165.0	**0.8806**	**1.5038**	
	165.1 [136] 165 [68] 164.8-165 [169] 164-165 [100] 163 [131] 162 [168] 163.7 -163.9 753 [37] 62-63 20-21 [14] 54-55.5 10 [75]	0.8786 24.7° [14] 0.8841 15.7° [169] 0.8884 12.1° [168] 0.8884 11.5° [168] 0.8885 11.4° [168]	1.5031(a) [168] 1.50381 [70,170] 1.50413 [170] 1.5042 [169] 1.50198 24.7° [14] 1.50611 15.7° [169,170] 1.50656 12.1° [168] 1.50705 11.4° [168] 1.51053 5.5° [170] 1.49805 $n_{H\alpha}^{20}$ [37] 1.50213 $n_{H\alpha}^{15.7}$ [169] 1.50260 $n_{H\alpha}^{12.1}$ [168] 1.50301 $n_{H\alpha}^{11.4}$ [168] 1.51316 $n_{H\beta}^{20}$ [37] 1.51745 $n_{H\beta}^{15.7}$ [169] 1.51793 $n_{H\beta}^{12.1}$ [168] 1.51834 $n_{H\beta}^{11.4}$ [168] 1.52248 $n_{H\gamma}^{20}$ [37] 1.52693 $n_{H\gamma}^{15.7}$ [169] 1.52741 $n_{H\gamma}^{12.1}$ [168] 1.52789 $n_{H\gamma}^{11.4}$ [168] 1.50219 n_{He}^{20} [37]	

* $\frac{dD}{dt} = -0.0009068/°C$ (11 to 25°C)

† $\frac{dn}{dt} = -0.0004477/°C$ (5 to 25°C)

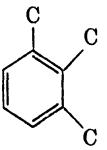
(a) This refractive index is the average of two or more determinations.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}		n_D^{20}		Additional Data
1-Methyl-3-ethylbenzene 						*
	161.5	**0.8657**		**1.4967**		
	163 [83]	0.867 [83]		1.49641 [170]		
	162.5 [68]	0.868	D_{20}^{20} [94]	1.4975 [169]		
	161.5–162.5 [53,169]	0.8669	19.9° [170]	1.49650	19.8° [170]	
	161.6 [136]	0.8690	17.9° [169]	1.49849	17.9° [169]	
	161.5 [131]	0.8692	D_{17}^{17} [167]	1.50220	7.0° [170]	
	159.7–160.5 [170]	0.871	D_{15}^{15} [53]	1.49229	$n_{H\alpha}^{20}$ [37]	
	160 [24]			1.49575	$n_{H\alpha}^{19.9}$ [170]	
	159.2–159.8 [37]			1.49279	$n_{H\alpha}^{19.8}$ [170]	†
	159 [146,170]			1.49456	$n_{H\alpha}^{17.9}$ [169]	
	158–159 [190,191]			1.50734	$n_{H\beta}^{20}$ [37]	
	157–159 [167]			1.51102	$n_{H\beta}^{19.9}$ [170]	
	158 [8,23]			1.50767	$n_{H\beta}^{19.8}$ [170]	
				1.50973	$n_{H\beta}^{17.9}$ [169]	
				1.51650	$n_{H\gamma}^{20}$ [37]	
				1.52056	$n_{H\gamma}^{19.9}$ [170]	
* $\frac{dD}{dt} = -0.0008621$/°C (15 to 20°C)				1.51678	$n_{H\gamma}^{19.8}$ [170]	
				1.51920	$n_{H\gamma}^{17.9}$ [169]	
† $\frac{dn}{dt} = -0.0004472$/°C (7 to 20°C)				1.49654	n_{He}^{20} [37]	
1-Methyl-4-ethylbenzene 						
	162.3	**0.8626**		**1.4952**		
−56 [144]	162–163 [90]	0.8606 [144]		1.4943 [169]		
	162.5 [72,136]	0.862 [80,83]		1.49481 [170]		
	161.6-162.5 [169A]	0.8626 [192]		1.4953 [171]		
	162.0 [177]	0.863 [171]		1.49539 [170]		
	162 [68,83,107]	0.7393	162° [139]	1.4959 [144]		
	161–162(a)	0.7394	162° [139]	1.49595 [170]		
	161.5 [131]	0.7393	161.8° [141]	1.492505	25° [90]	
	161 [170]	0.85740	25° [90]	1.49287	24.4° [171]	
	160–161 [49,146]	0.8597	22.8° [169]	1.49303	22.8° [169]	
	160.5 [170]	0.8601	22.3° [169]	1.4951	21° [192]	

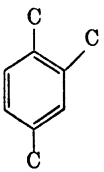
M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1-Methyl-4-ethylbenzene (*Continued*)			0.862	22° [179,180]	1.4962	16° [167]	*
			0.863	D_{20}^{20} [94]	1.49775	15.9° [170]	
					1.49750	15.2° [170,171]	
	160 [170]		0.8620	$D_{18.5}^{18.5}$ [169A]	1.50088	6.2° [170]	
	159.5		0.8644	17° [90]	1.48921	$n_{H\alpha}^{22.8}$ [169]	
	−160.0	763 [87]	0.8650	16.8° [170]	1.48957	$n_{H\alpha}^{20}$ [37]	
	161.8	761.3 [141]	0.8657	15.9° [170]	1.49068	$n_{H\alpha}^{20}$ [37]	
	161.9		0.8664	15.8° [171]	1.4911	$n_{H\alpha}^{20}$ [171]	
	−162.1	756.3 [139]	0.8667	14.6° [80]	1.49372	$n_{H\alpha}^{15.9}$ [170]	
	162	755 [117,192]	0.8690	14° [72]	1.49325	$n_{H\alpha}^{15.2}$ [171]	
	159–160	750 [87]	0.8685	13.4° [169]	1.49514	$n_{H\alpha}^{14.6}$ [80]	
	49.5–50	11 [144]	0.8687	13.1° [169]	1.49588	$n_{H\alpha}^{13.4}$ [169]	
			0.8694	11.3° [139]	1.50417	$n_{H\beta}^{22.8}$ [169]	
					1.50433	$n_{H\beta}^{20}$ [37]	
					1.50563	$n_{H\beta}^{20}$ [37]	†
					1.50889	$n_{H\beta}^{15.9}$ [170]	
					1.50831	$n_{H\beta}^{15.2}$ [171]	
					1.51017	$n_{H\beta}^{14.6}$ [80]	
					1.51136	$n_{H\beta}^{13.4}$ [169]	
					1.51353	$n_{H\gamma}^{22.8}$ [169]	
					1.51367	$n_{H\gamma}^{20}$ [37]	
					1.51500	$n_{H\gamma}^{20}$ [37]	
					1.51833	$n_{H\gamma}^{15.9}$ [170]	
					1.51779	$n_{H\gamma}^{15.2}$ [171]	
					1.51950	$n_{H\gamma}^{14.6}$ [80]	
* $\frac{dD}{dt} = -0.0008414$/°C		(11 to 25°C)			1.52116	$n_{H\gamma}^{13.4}$ [169]	
					1.49388	n_{He}^{20} [37]	
† $\frac{dn}{dt} = -0.0004592$/°C		(6 to 25°C)			1.49483	n_{He}^{20} [37]	

(a) The boiling point 161-162 is found in references 3, 31, 65, 146, 169, 179, 180.

1,2,3-Trimethylbenzene
(Hemellitene)



−25.47	**176.1**	**0.8947**		**1.5138**
−25.4 [91]	177 [83]	0.893 [173]		1.5130 [154]
−25.47 [99,154]	176.10 [99]	0.8944 [154]		1.5132 [169]
	176.1 [136]	0.895 [83,169]		1.5110
	175–176 [38]	0.8951 [99]	25° [154]	1.5116
	175.5 [131]	0.8866	30° [154]	1.51335
	175–175.5 [62,63,69]	0.8906	25° [154]	1.5160
	174.7–175.5 [173]	0.8913	22.0° [173]	1.5189
				19.55° [169]
				15° [154]
				10° [154]

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,3-Trimethylbenzene (Hemellitene) (*Continued*)		0.8949 19.55° [169]	1.5209 5° [154]	*
		0.901 15° [69,185]	1.50716 $n_{H\alpha}^{22.0}$ [173]	
		0.9101 0° [154]	1.50930 $n_{H\alpha}^{19.55}$ [169]	
	175.0–175.3 [74]		1.52287 $n_{H\beta}^{22.0}$ [173]	
	175 [85,185]		1.52503 $n_{H\beta}^{19.55}$ [169]	
	175.5 744 [169]		1.53270 $n_{H\gamma}^{22.0}$ [173]	†
	58 12 [182]		1.53483 $n_{H\gamma}^{19.55}$ [169]	
			1.51173 $n_{He}^{22.0}$ [173]	
* $\frac{dD}{dt} = -0.0008035$/°C (0 to 30°C)			1.51208 n_{He}^{20} [36]	
† $\frac{dn}{dt} = -0.0004648$/°C (5 to 25°C)			1.5126 n_{He}^{20} [173]	
1,2,4-Trimethylbenzene (Pseudocumene) 				
−44.1	**169.3**	**0.8762**	**1.5049**	Crit. Temp. (°C)
−44.09 [99]	170.2 ± 0.3 [160]	0.8762 [99]	1.5046 [169]	381.2 [2]
−44.5 [56,118]	170 [106A,146]	0.87640 [13]	1.5048 [151]	
−45.00 ± 0.05 [153]	169–170 [81]	0.8767 [4]	1.5051 [47,171]	Crit. Pressure (mm Hg)
−45 [91]	169.8(a)	0.8465 D_{95}^{95} [121]	1.50512 [170]	
	169.75 [86]		1.50523 [76]	
	169.5 [62,85,189]	0.8478 D_{90}^{90} [121]	1.5025 25° [99]	25,232.0 [2]
	169.27 [133]		1.5032 24° [153]	
	169.2 [111,136]	0.8494 D_{85}^{85} [121]	1.50441 21.6° [20]	
	168.7–169.2 [169]	0.8510 D_{80}^{80} [121]	1.5045 21° [45]	
	169.18 [99]		1.50527 19.9° [76,170]	
	169 [65,83,101A,127]	0.8526 D_{75}^{75} [121]	1.50639 17° [28]	
	168.5 [131]	0.8544 D_{70}^{70} [121]	1.5072 14.7° [86]	
	168.0–168.5 [121]		1.50780 14.1° [171]	
	168.4 [64]	0.8560 D_{65}^{65} [121]	1.50780 13.9° [170]	
	168.2 [30,89]	0.8578 D_{60}^{60} [121]	1.51106 6.8° [170]	
	168.1 [30]		1.50001 $n_{H\alpha}^{21.6}$ [20]	
	169.4	0.8598 D_{55}^{55} [121]	1.5004 $n_{H\alpha}^{20}$ [171]	
	−169.6 764.8 [134]	0.8620 D_{50}^{50} [121]	1.50184 $n_{H\alpha}^{17}$ [28]	
	168.8 750 [189]	0.8643 D_{45}^{45} [121]	1.50259 $n_{H\alpha}^{15.3}$ [169]	
	168.0	0.86025 40° [13]	1.5030 $n_{H\alpha}^{14.7}$ [86]	
	−168.2 742 [151]	0.8667 D_{40}^{40} [121]	1.50316 $n_{H\alpha}^{14.1}$ [171]	
	167.8 738.8 [153]	0.8692 D_{35}^{35} [121]	1.50625 $n_{H\alpha}^{8}$ [122]	
	166.0 700 [189]	0.8685 30° [4]	1.51745 $n_{H\beta}^{17}$ [28]	
	165.9 698.8 [153]	0.8719 D_{30}^{30} [121]	1.51841 $n_{H\beta}^{15.3}$ [169]	
	163.0 650 [189]			
	162.3 636.3 [153]			
	160.9 612.3 [153]			

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1,2,4-Trimethylbenzene (Pseudocumene) (*Continued*)			0.8747	D_{25}^{25} [121]	1.5184	$n_{H\beta}^{14.7}$ [86]	*
			0.8747	21.6° [20]	1.51904	$n_{H\beta}^{11.1}$ [171]	
			0.8778	D_{20}^{20} [121]	1.52197	$n_{H\beta}^{8}$ [122]	
	159.7	600 [189]	0.8794	15.3° [169]	1.52501	$n_{H\gamma}^{21.6}$ [20]	
	158.1	573.3 [153]	0.8810	D_{15}^{15} [121]	1.52816	$n_{H\gamma}^{15.3}$ [169]	
	156.3	550 [189]	0.8805	14.1° [171]	1.5282	$n_{H\gamma}^{14.7}$ [86]	
	156.2	543.7 [153]	0.8844	D_{10}^{10} [121]	1.52878	$n_{H\gamma}^{14.1}$ [171]	
	154.4	516.2 [153]	0.88567	8° [122]	1.53192	$n_{H\gamma}^{8}$ [122]	
	152.6	500 [189]	0.8880	D_5^5 [121]	(b)		†
	152.1	483.7 [153]	0.8888	D_4^4 [121]			
	150.1	458.2 [153]	0.89260	0° [13]			
	147.0	417.2 [153]					
	143.3	373.7 [153]					
	140.1	341.6 [153]					
	134.9	290.6 [153]					
	130.8	255.1 [153]					
	127.7	231.6 [153]					
	122.6	196.6 [153]					
	115.1	152.5 [153]					
	111.1	132 0 [153]					‡
	105.0	106.0 [153]					
	99.6	86.5 [153]					
	98.6	83.0 [153]					
	92.0	63.0 [153]					
	89.1	56.0 [153]					
	74	28 [20]					
	73.1	28.0 [153]					
	68	22 [153]					
	61.6	15.5 [153]					
	55.56	15 [174]					§
	57.6	13 [153]					
	50.5	12 [27]					
	47.1	7 [153]					

* $\frac{1}{T_b} = 0.0035812 - 0.0004585 \log_{10} p_{mm}$ (180 to 765 mm)

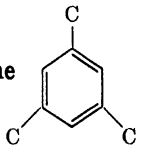
† $\frac{1}{T_b} = 0.0034793 - 0.0004118 \log_{10} p_{mm}$ (7 to 175 mm) ¶

‡ $\frac{dD}{dt} = -0.0008069[1 + 0.0005497(t - 20)]/°C$ (0 to 95°C)

§ $\frac{dD}{dt} = -0.0008051/°C$ (0 to 40°C)

¶ $\frac{dn}{dt} = -0.0004704/°C$ (6 to 25°C)

(a) The boiling point 169.8 is found in references 47, 69, 145, 182, 183, 185.
(b) Refractive indices of other lines are found in reference 20.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}		n_D^{20}		Additional Data
1,3,5-Trimethylbenzene (Mesitylene) 						
−44.8	**164.7**	**0.8637**				Crit. Temp. (°C)
−44.78 [99]	165 [16,73,85]	0.8623 [110]		1.49116 [19]		370.5 [17]
−46.1 [64]	164.8–164.9 [134]	0.8628 [181]		1.4953 [171]		370.45(c) [108]
−51.4(d) [32]	164.1–164.9 [74]	0.8634 [134]		1.4962 [181]		367.7 [2,51,177]
−51.7(d) [91,99]	164.5–164.8 [113,163]	0.8638 [4]		1.4967 [99,169]		367.6 [178]
−52.7(d) [160]	164.2–164.8 [114]	0.8642 [36,128]		1.4974 [151]		
−54−−53(d) [25]	164.72 [133]	0.8653 [99]		1.4981 [82]		Crit. Pressure (mm Hg)
−53.5(d) [96]	164.7 [111]	0.8667 [46]		1.4992 [99]		
−54.4(d) [106]	164.64 [99]	0.7372	165° [141]	1.4995 [32]		
	164.6 [40,87,88,99,136]	0.7372	164.5° [139,140]	1.49961 [170]		25,232.0 [2]
	164.6 ± 0.2 [160]			1.49981 [170]		
	164.5–164.6 [135]	0.8328	D_{95}^{95} [121]	1.4958	22.5° [26]	
	164.3–164.6 [112]			1.4928	21.5° [58]	
	164.5(a)	0.8342	D_{90}^{90} [121]	1.49271	20.6° [172]	
	163.5–164.5 [1]	0.8358	D_{85}^{85} [121]	1.4988	19.8° [128]	
	164.4 [30]			1.4960	19° [50]	
	164.3 [178]	0.8374	D_{80}^{80} [121]	1.49541	18° [28]	
	164.0 [181]	0.8158	75° [4]	1.49804	17.05° [169]	
	164.0 ± 0.4 [46]	0.8392	D_{75}^{75} [121]	1.4945	17° [66]	
	164 [79,84,137,184]			1.4966	14.6° [86]	
	164.6	0.8419	D_{70}^{70} [121]	1.50228	14.2° [170,171]	
	−165.5 769 [105]	0.8429	D_{65}^{65} [121]	1.50595	6.7° [76,170]	
	165 769 [36]	0.8310	60° [4]	1.48832	$n_{H\alpha}^{20.6}$ [172]	
	163.8	0.8449	D_{60}^{60} [121]	1.48701	$n_{H\alpha}^{20}$ [19]	
	−164.8 763 [42]			1.49127	$n_{H\alpha}^{18}$ [28]	
	165 762 [141]	0.8471	D_{55}^{55} [121]	1.49403	$n_{H\alpha}^{17.05}$ [169]	
	164.5 759.2 [139]	0.8393	50° [4]	1.4926	$n_{H\alpha}^{14.6}$ [86]	
	163 747 [95]	0.8493	D_{50}^{50} [121]	1.49774	$n_{H\alpha}^{14.2}$ [171]	
	164 745 [116]	0.8516	D_{45}^{45} [121]	1.49985	$n_{H\alpha}^{7.6}$ [122]	
	161.8	0.8476	40° [4]	1.50341	$n_{H\beta}^{20.6}$ [172]	
	−162.8 720 [34]	0.8540	D_{40}^{40} [121]	1.50146	$n_{H\beta}^{20}$ [19]	
	66.4 24.5 [124]	0.8565	D_{35}^{35} [121]	1.50611	$n_{H\beta}^{18}$ [28]	
	66.0 22 [151]	0.8557	30° [4]	1.50936	$n_{H\beta}^{17.05}$ [169]	
	66 22 [152]	0.8592	D_{30}^{30} [121]	1.5073	$n_{H\beta}^{14.6}$ [86]	
	10.6 0.91 [93]	0.855189	29.49° [120]	1.51333	$n_{H\beta}^{14.2}$ [171]	
	10.2 0.91 [93]	0.85402	28.6° [145]	1.51521	$n_{H\beta}^{7.6}$ [122]	
	3.2 0.53 [93]	0.8614	D_{25}^{25} [42]	1.51292	$n_{H\gamma}^{20.6}$ [192]	
	2.7 0.50 [93]	0.8620	D_{25}^{25} [121]	1.51033	$n_{H\gamma}^{20}$ [19]	
	2.3 0.50 [93]					
	1.5 0.43 [93]					
	−1.7 0.34 [93]					
	−1.20 0.33 [93]					

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1,3,5-Trimethylbenzene (Mesitylene) (*Continued*)			0.8643	21.0° [172]	1.51891	$n_{H\gamma}^{17.05}$ [169]	*
			0.8652	D_{20}^{20} [121]	1.5165	$n_{H\gamma}^{14.6}$ [86]	
			0.8632	19° [50]	1.52311	$n_{H\gamma}^{14.2}$ [171]	
	−2.75	0.29 [93]	0.8646	17.05° [169]	1.52460	$n_{H\gamma}^{7.5}$ [122]	
	−4.2	0.28 [93]	0.8678	D_{15}^{15} [163]	1.49957	n_{He}^{20} [36]	
			0.8685	D_{15}^{15} [121]		(b)	
			0.8697	14.1° [171]			†
			0.8722	D_{10}^{10} [121]			
			0.87397	7.6° [122]			
			0.8760	D_5^{5} [121]			
			0.8768	D_4^{4} [121]			

* $\frac{1}{T_b} = 0.0036108 - 0.00046055 \log_{10} p_{mm}$ (720 to 770 mm)

† $\frac{dD}{dt} = -0.0008203[1 + 0.0008738(t - 20)]/°C$ (4 to 165°C)

(a) The boiling point 164.5 is found in references 30, 33, 69, 96, 128, 131, 140, 146, 177, 185.
(b) Refractive indices of other lines may be found in reference 50.
(c) This temperature is the average of two determinations.
(d) This melting point probably refers to the metastable form of the compound.

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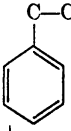
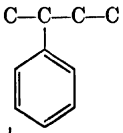
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
	C—C—C—C 			*
***n*-Butylbenzene**				
	183.3	**0.8604$_5$**		
−81.2 [210]	183.1–183.5 [86]	0.8608 [80]	1.4880 [56,64]	
−88.5 [86,158,209]	183.46 ± 0.01 [15]	0.8612 [218]	1.4899 [181,182]	
	183.3 [65]	0.8613 [136,181,182]	1.4900 [80]	
	183.10 [210]	0.862 [65]	1.4914 [65]	
	182.1–183.1 [56,64]	0.8668 [56,64]	1.4936 [218]	
	183 [1,38,143,176]	0.72466 181 30° [147]	1.4895 21.8° [159]	
	181–182 [205]		1.4942 17.5° [26]	
	180–181 [218]	0.74557 156.70° [147]	1.49210 15° [210]	
	180 [107,123,129,165]		1.494 13.5° [107]	
	179.5	0.76869 129.80° [147]	1.4907 13° [1]	
	−180.5 748 [13,26]		1.48815 $n_{H\alpha}^{15}$ [210]	
	178–179 735 [159]	0.79445 99.55° [147]	1.50190 $n_{H\beta}^{15}$ [210]	
	79 23 [80]	0.81392 76.15° [147]	1.51030 $n_{H\gamma}^{15}$ [210]	
	72–75 21 [200]	0.82673 61.55° [147]	1.49254 n_{He}^{15} [210]	
	91.5–93.0 12 [159]	0.83901 45.95° [147]		
	66–68 12 [182]	0.84527 38.30° [147]		
	12.2 0.48 [134]	0.85245 30° [210]		
	5.5 0.25 [134]	0.8535 30° [182]		
	−4.7 0.10 [134]	0.8561 25.13° [15,138]		
		0.8561 25° [14]		
		0.85760 22.85° [147]		
		0.862 D_{20}^{20} [135]		
		0.8620 D_0^{20} [110A]		
		0.86202 D_0^{20} [111]		
		0.8622 16° [165]		
		0.86391 15.15° [147]		
		0.86475 15° [210]		
		0.87608 0° [147]		
		0.87695 0° [210]		
		0.8761 D_0^0 [110A,111]		
		0.89440 −22.9° [147]		
		0.91210 −45 2° [147]		
		0.94226 −83.6° [147]		
		0.95132 −95.1° [147]		

* $\frac{dD}{dt} = -0.00081118[1 + 0.0004963(t - 20)]/°C$ (−95 to 182°C)

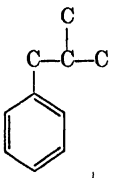
† $\frac{dD}{dt} = -0.0008130/°C$ (0 to 40°C)

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Phenylbutane (*sec*-Butylbenzene)				
	172.5	**0.8608**	**1.4898**	
−82.7 [208]	173–174.5 [25]	0.8606 [55]	1.4885 [33]	$[\alpha]_D^{180}$ = +1.36°(a) [132]
	174 [159]	0.86205(c) [80]	1.4900 [80,85,213]	
	173–174 [85,106,202]	0.8624 [213]	1.4902 [88]	$[\alpha]_D^{24}$ = +1.18°(a) [131]
	172.3–173.3 [26]	0.8639(a) [78]	1.4863 25° [202]	
	173 [22]	0.8364 50° [55]	1.4870(b) 25° [132]	$[\alpha]_D^{22}$ = +0.055° [33]
	172–173 [105]	0.8404 45° [55]	1.4878(a) 25° [132]	
	172.5 [208]	0.8443 40° [55]	1.4880 25° [148]	$[\alpha]_D^{22}$ = +0.03° [33]
	172(a) [78]	0.8483 35° [55]	1.4894 21° [106]	
	170–172 [28]	0.8563 30° [55]	1.4895 20.8° [159]	$[\alpha]_D^{24}$ = −1.92°(a) [130]
	171 [148]	0.8577 25° [148]	1.49165 16° [26]	
	170–172 744 [213]	0.8634 21° [106]		$[\alpha]_D^{24}$ = −2.13°(b) [133]
	173.2	0.8615 18° [26]		
	−174.2 742.4 [55]	0.8646 15° [55]		$[\alpha]_D^{23}$ = −2.30°(b) [132]
	75–76(b) 24 [132]	0.8669 15° [186]		
	71–74(a) 20 [132]	0.8687 10° [55]		
	69 20 [80]	0.8725 5° [55]		
	68(b) 20 [130,132,133]	0.8763 0° [55]		
	65–67 20 [33]			
	61–62 16 [73]			
	63(a) 15 [131]			
	60.2–60.4 15 [159]			
	9.8 0.53 [134]			
	2.6 0.32 [134]			
	−3.0 0.18 [134]			
	−8.6 0.10 [134]			

* $\frac{dD}{dt} = -0.0007947[1+0.002322(t-20)]/°C$ (0 to 50°C)

† $\frac{dn}{dt} = -0.0004846/°C$ (16 to 25°C)

(a) This constant was determined on the *dextro*rotatory form.
(b) This constant was determined on the *levo*rotatory form.
(c) This density is the average of two determinations.

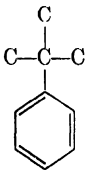
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-2-methylpropane (Isobutylbenzene) 				
	170.1	**0.8673**	**1.4928**	Crit. Temp. (°C)
	171 [123,146,166]	0.8628 [237]	1.4871 [80]	377.1 [5]
	170 [176]	0.86726 [124]	1.49338 18.5° [25]	
	169–169.5 [160,161]	0.8650 D_{25}^{25} [160]	1.4957 14.5° [124,146]	Crit. Pressure (mm Hg)
	169.2 [234]	0.86440 23.6° [184]	1.49851 7.9° [161]	
	168 [139]		1.4916 $n_{H\alpha}^{14.5}$ [124]	
	167–168 [41]	0.8680 D_{20}^{20} [160]	1.49459 $n_{H\alpha}^{7.9}$ [161]	23,636.0 [5]
	167.5 [165]	0.86874 18.2° [124]	1.5056 $n_{H\beta}^{14.5}$ [124]	
	167.0 [124,184]	0.87036 16.1° [124]	1.50858 $n_{H\beta}^{7.9}$ [161]	
	167 [119,235]	0.8714 D_{15}^{15} [160]	1.5141 $n_{H\gamma}^{14.5}$ [124]	
	169.2 800 [235]	0.87181 14.3° [124]	1.51772 $n_{H\gamma}^{7.9}$ [161]	
	170 756 [236]	0.87195 14.1° [124]		
	168–171 755 [199A]	0.87243 13.5° [124]		
	166.8 750(a) [235]	0.8748 D_{10}^{10} [160]		
	164.2 700(a) [235]	0.87620 7.9° [161]		
	161.3 650(a) [235]	0.8790 D_5^5 [160]		
	158.3 600(a) [235]	0.8796 D_4^4 [160]		
	155.1 550(a) [235]			
	151.6 500(a) [235]			
	147.6 450(a) [235]			
	143.4 400(a) [235]			
	138.6 350(a) [235]			
	133.4 300(a) [235]			
	127.1 250(a) [235]			
	120.0 200(a) [235]			
	110.9 150(a) [235]			
	98.7 100(a) [235]			
	79.0 50(a) [235]			
	59.5 12 [80]			

* $\frac{dD}{dt} = -0.0007641/°C$ (4 to 25°C)

† $\frac{dn}{dt} = -0.0004783/°C$ (7 to 20°C)

(a) Since 235 is the only reference giving boiling points at pressures of 50 mm to 750 mm, these values were not used to obtain a boiling point-pressure equation. Data on other compounds indicate that the boiling points given at these pressures in this reference are too low.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
				*



***tert*-Butylbenzene**
(2-Phenyl-2-methylpropane)

−58.1	**169.0**	**0.8669**		
−58 [65,209]	168.5–170 [88]	0.8660 [213]	1.4908 [190]	
−58.1 [87,140,158]	169.5 [11]	0.8664 [34]	1.4912 [88]	
−60.9 [207]	169.3–169.5 [159]	0.8665 [81]	1.4918 [213]	
	168.5–169.5 [156]	0.867 [119]	1.4919 [81]	
	169.3 ± 0.3 [207]	0.8671 [71,168]	1.4921 [189]	
	169 [71,119]	0.8673 [71]	1.49235(a) [231]	
	168.7 [65,140]	0.86733 [128]	1.4929 [12]	
	168.5 [28]	0.8077 90.7° [34]	1.4930 [71]	
	170.0 772 [12]	0.8204 75.6° [34]	1.49609 [163]	
	168.6	0.8273 67.5° [34]	1.4963 [17]	
	−168.7 759.0 [168]	0.8403 51.9° [34]	1.4969 [65,140]	
	168.5	0.8490 41.4° [34]	1.4970 [85]	
	−168.8 758 [87]	0.8570 31.5° [34]	1.4905 25° [40,148]	
	168.8	0.8623 25° [40,148]	1.4958 24° [199]	
	−169 757.7 [34]	0.8636 23.3° [87]	1.4942 23° [198]	
	168.8	0.8690 $D_{15}^{19.5}$ [46]	1.4920 20.8° [159]	
	−169.0 751.4 [167]	0.8716 15° [186]	1.4924 20.4° [231]	
	167	0.8718 15° [186]	1.49668 18.5° [25]	
	−167.5 736 [186]	0.8752 9.4° [34]	1.49724 18.5° [25]	
	103 108 [231]	0.8828 0° [34]		
	84.2 50 [31]			
	58–58.2 16 [159]			
	13.7 1.08 [134]			
	10.8 0.82 [134]			
	2.3 0.43 [134]			
	−2.0 0.27 [134]			

* $\frac{1}{T_b} = 0.00361049 - 0.0004682 \log_{10} p_{mm}$ (100 to 772 mm)

† $\frac{dD}{dt} = -0.0008187[1 + 0.0007479(t - 20)]/°C$ (0 to 91°C)

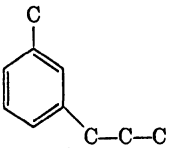
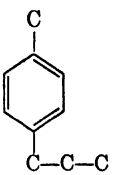
‡ $\frac{dD}{dt} = -0.0008148/°C$ (0 to 32°C)

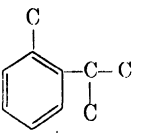
(a) This refractive index is the average of two or more determinations.

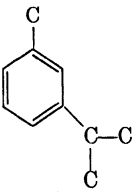
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Deutero-2-benzylpropane (Benzyldimethylmethane-d)	170.5–171.5 [30]			
1-Methyl-2-*n*-propylbenzene		**0.8742**	**1.4993**	
	184 [214]	0.874 [53,214]	1.49931 [110,216]	
	180–182 [100]	0.8748 [100]	1.4995 [214]	
	180.5	0.8752 [53]	1.4999 19° [117]	
	−181.5 [53]	0.8747 19° [117]	1.50139 15.75° [214]	
	65–68 14 [117]	0.8770 15.75° [214]	1.5032 13° [117]	
		0.8891 0° [100]	1.50594 5.7° [216]	
			1.49476 $n_{H\alpha}^{20}$ [53]	
			1.49532 $n_{H\alpha}^{20}$ [53]	
			1.49765 $n_{H\alpha}^{15.75}$ [214]	
			1.50915 $n_{H\beta}^{20}$ [53]	
			1.50980 $n_{H\beta}^{20}$ [53]	
			1.51218 $n_{H\beta}^{15.75}$ [214]	
			1.51791 $n_{H\gamma}^{20}$ [53]	
			1.51857 $n_{H\gamma}^{20}$ [53]	
			1.52125 $n_{H\gamma}^{15.75}$ [214]	
			1.49909 n_{He}^{20} [53]	
			1.49976 n_{He}^{20} [53]	

* $\frac{dD}{dt} = -0.00073985/°C$ (0 to 20°C)

† $\frac{dn}{dt} = -0.0004630/°C$ (5 to 20°C)

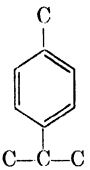
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-3-*n*-propylbenzene 				*
	179.4		**1.4937**	
	181.5–182.5 [214]	0.8601 [216]	1.49230 [216]	
	180 [216]	0.862 [214]	1.49321 [216]	
	176–179 [239]	0.8625 [53]	1.49510 [110,216]	
	177–178.5 [216]	0.864 D_{20}^{20} [135]	1.4951 [214]	
	176–178 [75]	0.8646 17.6° [216]	1.49340 17.6° [216]	
	176.5–177.5 [53]		1.49640 17.0° [214]	
	178–180 757 [66]	0.8651 D_{17}^{17} [239]	1.4945 16° [239]	
		0.8648 17.0° [214]	1.50185 5.2° [216]	
		0.865 D_{15}^{15} [75]	1.48978 $n_{H\alpha}^{20}$ [216]	
			1.48981 $n_{H\alpha}^{20}$ [53]	
			1.48968 $n_{H\alpha}^{17.6}$ [216]	
			1.49262 $n_{H\alpha}^{17.0}$ [214]	
			1.50392 $n_{H\beta}^{20}$ [216]	
			1.50433 $n_{H\beta}^{20}$ [53]	
			1.5038 $n_{H\beta}^{17.6}$ [216]	
			1.50738 $n_{H\beta}^{17.0}$ [214]	
			1.51320 $n_{H\gamma}^{20}$ [53]	
			1.51646 $n_{H\gamma}^{17.0}$ [214]	
* $\frac{dn}{dt} = -0.0005484$/°C (5 to 20°C)			1.49398 n_{He}^{20} [53]	
1-Methyl-4-*n*-propylbenzene 				
	183.2	**0.8588**	**1.4944**	
−62 [188]	182–185 [239]	0.8570 [53]	1.49228 [216]	
	183 184 [50,89,136]	0.858 [216]	1.4924 [50]	
	183 [216]	0.8591 [50,183]	1.49246 [216]	
	182–183 [214]	0.860 [216]	1.4930 [183]	
	182.5 [216]	0.858 D_{25}^{25} [89]	1.49485 [216]	
	182 [216]	0.8554 23.7° [216]	1.4954 [214]	
	181.0–181.4 [216]		1.49542 [110,216]	
	179.5–180.0 [53]	0.861 D_{20}^{20} [135]	1.49588 [216]	
	183–184 774 [232]	0.8617 18.8° [216]	1.49602 [216]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-4-*n*-propylbenzene (*Continued*)		0.8620 18.8° [216] 0.8642 15.4° [214]	1.49065 23.7° [216] 1.49180 21.5° [216] 1.49641 18.8° [216] 1.49655 18.8° [216] 1.4943 16° [289] 1.49749 15.4° [216] 1.50200 5.1° [216] 1.48706 $n_{H\alpha}^{23.7}$ [216] 1.48781 $n_{H\alpha}^{20}$ [53] 1.49269 $n_{H\alpha}^{18.8}$ [216] 1.49278 $n_{H\alpha}^{18.8}$ [216] 1.49371 $n_{H\alpha}^{15.4}$ [214] 1.50119 $n_{H\beta}^{23.7}$ [216] 1.50213 $n_{H\beta}^{20}$ [53] 1.50752 $n_{H\beta}^{18.8}$ [216] 1.50765 $n_{H\beta}^{18.8}$ [216] 1.50863 $n_{H\beta}^{15.4}$ [214] 1.51111 $n_{H\gamma}^{20}$ [53] 1.51687 $n_{H\gamma}^{18.8}$ [216] 1.51804 $n_{H\gamma}^{15.4}$ [214] 1.49197 n_{He}^{20} [53]	
	66 11 [183]			
* $\frac{dD}{dt} = -0.0009731$/°C (15 to 24°C) † $\frac{dn}{dt} = -0.0005733$/°C (5 to 25°C)				
1-Methyl-2-isopropylbenzene (*o*-Cymene) 				
	175.1	**0.8752**		
−25.5 [153]	175–176 [214] 174.5–175.5 [53] 175 [53,153,177,178,214] 176.6 754 [44]	0.8741 [53] 0.8754 [44] 0.876 [214] 0.8740 D_0^{22} [177,178] 0.8789 16.15° [214] 0.879 $D_{15.5}^{15.5}$ [153] 0.8902 D_0^{0} [177,178]	1.5003 [214] 1.501 22° [177,178] 1.5022 19° [44] 1.50206 16.15° [214] 1.49428 $n_{H\alpha}^{20}$ [53] 1.49513 $n_{H\alpha}^{20}$ [53] 1.49826 $n_{H\alpha}^{16.15}$ [214] 1.50858 $n_{H\beta}^{20}$ [53] 1.50942 $n_{H\beta}^{20}$ [53] 1.51290 $n_{H\beta}^{16.15}$ [214] 1.51746 $n_{H\gamma}^{20}$ [53] 1.51838 $n_{H\gamma}^{20}$ [53] 1.52185 $n_{H\gamma}^{16.15}$ [214] 1.49862 n_{He}^{20} [53] 1.49957 n_{He}^{20} [53]	
* $\frac{dD}{dt} = -0.0007470$/°C (0 to 22°C)				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-3-isopropylbenzene (*m*-Cymene) 				
	175.6	**0.8614**	**1.4922_5**	
−25 [153]	173–177 [102]	0.860 [119,214]	1.4920 [169]	
	176–176.5 [36]	0.8606 [169]	1.49216 [121]	
	176 [9]	0.8619 [53]	1.49222 [227]	
	175–176 [79,227]	0.862 [206,227]	1.4925 [214]	
	174–176 [206]	0.8631 [53]	1.49385 17.05° [214]	
	175.6–175.8 [169]	0.8584 26.5° [102]	1.4968 10° [169]	
	175.7 [153]	0.8590 D_0^{22} [177,178]	1.4881 $n_{H\alpha}^{20}$ [121]	
	174.5–175.5 [53]		1.48915 $n_{H\alpha}^{20}$ [53]	
	175 [119,123,214]	0.865 D_{20}^{20} [135]	1.48934 $n_{H\alpha}^{20}$ [53]	
	174–175 [177,178]	0.8626 D_{20}^{20} [121]	1.4885 $n_{H\alpha}^{19.6}$ [169]	
	174.7	0.8628 17.05° [214]	1.49016 $n_{H\alpha}^{17.05}$ [214]	
	−175.7 758.6 [121]	0.8763 D_0^{0} [121]	1.50213 $n_{H\beta}^{20}$ [121]	
	173 750 [66]		1.50356 $n_{H\beta}^{20}$ [53]	
	66.5 17.6 [169]		1.50366 $n_{H\beta}^{20}$ [53]	
			1.5028 $n_{H\beta}^{19.6}$ [169]	
			1.50452 $n_{H\beta}^{17.05}$ [214]	
			1.51100 $n_{H\gamma}^{20}$ [121]	
			1.51263 $n_{H\gamma}^{20}$ [53]	
			1.51336 $n_{H\gamma}^{17.05}$ [214]	
			1.49340 n_{He}^{20} [53]	
			1.49369 n_{He}^{20} [53]	

* $\frac{dD}{dt} = -0.0007256$/°C (0 to 27°C)

† $\frac{dn}{dt} = -0.00049025$/°C (10 to 20°C)

1-Methyl-4-isopropylbenzene (*p*-Cymene) 				
−69.8	**176.9**	**0.8571**	**1.4903**	Crit. Temp. (°C)
−68.9 [86,158]	178 [188]	0.85618 [76]	1.4872 [43]	394.7(e) [151]
−72.3 [169]	177.0–177.5 [160]	0.85688(c) [101]	1.4887 [85]	
−73.0 [153]	177–177.5 [128]	0.8570 [169]	1.48894 [110]	
−73.25 [207]	176.5–177.5 [32]	0.8573 [152]	1.48935 [225]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}		n_D^{20}		Additional Data
1-Methyl-4-isopropylbenzene (*p*-Cymene) (*Continued*)		0.8575 [53,142]		1.4894(d) [214]		
		0.8580 [53]		1.4902 [144]		
		0.8581 [164]		1.4904 [169]		
		0.8582 [228]		1.49060 [101]		
−73.5 [70]	177.3–177.4 [85,169]	0.7248	175.4° [180]	1.4906 [228]		
−73.5(a) [122]	176.6–177.4 [82]	0.79963	90° [29]	1.49083 [120]		
−74 [65]	177.3 [142]	0.81624	70° [29]	1.48878	25° [128]	
	177.1–177.2 [27]	0.82439	60° [128]	1.4877	24.5° [65]	
	176.2–177.2 [120]	0.8235	59.45° [151]	1.48942	24.1° [216]	
	177.1 ± 0.25 [207]	0.83205	50° [128]	1.4868	21° [238]	
	177 0 [65]	0.83588	45° [128]	1.48895	21° [77]	
	177 [88]	0.83656	45° [29]	1.4893	21° [103]	
	176.7–177.0 [86]	0.83970	40° [128]	1.48885	20.2° [110]	
	176.6–177 [164]	0.85266	25° [29]	1.4920	18° [27]	
	176–177 [70,85,214]	0.85341	25° [128]	1.49271	16.1° [115]	
	176.7 [125,126,127]	0.8558	D_{25}^{25} [160]	1.49474	15.0° [214,216]	
	176.6 [228]	0.8552	21° [238]	1.4930	15° [48]	
	176.5 [69,103]	0.8574	D_{21}^{21} [103]	1.49159	14.0° [214,216]	
	176–176.5 [230]	0.8583	D_{20}^{20} [120]	1.49325	13.4° [214,216]	
	175.5–176.5 [53]	0.8586	D_{20}^{20} [160]	1.49419	11.0° [214]	
	176.0 [153]	0.8597	D_{20}^{20} [238A]	1.49664	7.9° [161]	
	175–176 [23,77,214,225]	0.85875	18° [128]	1.49752	5.9° [216]	
	175.5 [177,178]	0.8593	18° [27]	1.45130	$n_{H\alpha}^{91.2}$ [51]	
	175 [51,54,123,149A]	0.8584	17° [220]	1.45849	$n_{H\alpha}^{77}$ [51]	
	174.3–175 [101]	0.8590	17° [47]	1.47303	$n_{H\alpha}^{47.0}$ [51]	
	177.0	0.8598	17° [27]	1.48541	$n_{H\alpha}^{20.0}$ [51]	
	−177.4 768 [149]	0.8576	16.4° [214]	1.4865	$n_{H\alpha}^{20}$ [169]	
	176.0	0.8605	16.1° [115]	1.48664	$n_{H\alpha}^{20.0}$ [101]	
	−176.5 762 [53]	0.8601	15° [226]	1.48676	$n_{H\alpha}^{20}$ [120]	
	175.4	0.8606	15° [27]	1.48784(d)	$n_{H\alpha}^{20}$ [53]	
	−175.5 749.5 [180]	0.8608	15° [225]	1.48635	$n_{H\alpha}^{16.4}$ [214]	
	174.5	0.8615	15° [23]	1.4884	$n_{H\alpha}^{16.1}$ [115]	
	−175 748 [238]	0.8615	D_{15}^{15} [103]	1.49105	$n_{H\alpha}^{15.0}$ [214]	
	174.6 747 [144]	0.8619	D_{15}^{15} [160]	1.48799	$n_{H\alpha}^{14.0}$ [214]	
	175.5 744 [104]	0.8610	14.0° [214]	1.48965	$n_{H\alpha}^{13.4}$ [214]	
	175.4 743.7 [112]	0.8622	13.4° [214]	1.48983	$n_{H\alpha}^{11.0}$ [214]	
	175–176 743 [226]	0.8622	$D_{12.7}^{12.7}$ [101]	1.49257	$n_{H\alpha}^{7.9}$ [161]	
	175–176 735.5(b) [18]	0.8634	11.0° [214]	1.47164	$n_{H\beta}^{77}$ [51]	
	173–175 720 [18,19]	0.8654	D_{10}^{10} [160]	1.5007	$n_{H\beta}^{20}$ [169]	
	60–61 11 [174]	0.86700	7.9° [161]	1.50073	$n_{H\beta}^{20.0}$ [101]	
	55.5–56 10 [179]	0.8693	D_5^5 [160]	1.50089	$n_{H\beta}^{20}$ [120]	
	13.3 0.6 [134]	0.8701	D_4^4 [160]	1.50210(d)	$n_{H\beta}^{20}$ [53]	
	0.8 0.25 [134]	0.8732	0° [113]	1.50037	$n_{H\beta}^{16.4}$ [214]	
	0.0 0.23 [134]			1.50307	$n_{H\beta}^{16.1}$ [115]	
	−5.3 0.14 [134]			1.50537	$n_{H\beta}^{15.0}$ [214]	
	−5.5 0.14 [134]					

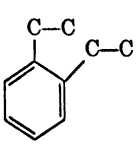
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-4-isopropylbenzene (*p*-Cymene) (*Continued*)			1.50208 $n_{H\beta}^{14.0}$ [214]	
			1.50396 $n_{H\beta}^{13.4}$ [214]	
			1.50413 $n_{H\beta}^{11.0}$ [214]	
			1.50698 $n_{H\beta}^{7.9}$ [161]	
			1.5094 $n_{H\gamma}^{20}$ [169]	
			1.50940 $n_{H\gamma}^{20.0}$ [101]	
			1.50930 $n_{H\gamma}^{20}$ [120]	
			1.51103(d) $n_{H\gamma}^{20}$ [53]	
			1.50911 $n_{H\gamma}^{16.4}$ [214]	
			1.51189 $n_{H\gamma}^{16.1}$ [115]	
			1.51449 $n_{H\gamma}^{15.0}$ [214]	
			1.51079 $n_{H\gamma}^{14.0}$ [214]	
			1.51283 $n_{H\gamma}^{13.4}$ [214]	
			1.51305 $n_{H\gamma}^{11.0}$ [214]	
			1.51599 $n_{H\gamma}^{7.9}$ [161]	
			1.45555 $n_{He}^{91.2}$ [51]	
			1.47699 $n_{He}^{47.0}$ [51]	
			1.48972 n_{He}^{20} [51]	
			1.4906 n_{He}^{20} [169]	
			1.49166(d) n_{He}^{20} [53]	

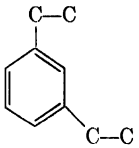
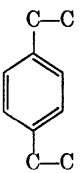
* $\frac{dD}{dt} = -0.0003158[1+0.0005370(t-20)]/°C$ (0 to 175°C)

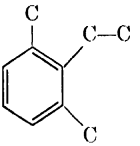
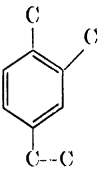
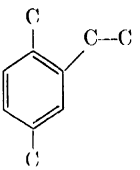
† $\frac{dD}{dt} = -0.0008076/°C$ (0 to 25°C)

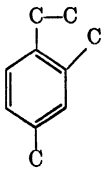
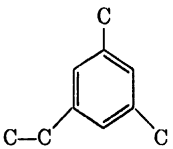
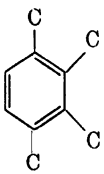
‡ $\frac{dn}{dt} = -0.0004830/°C$ (7 to 25°C)

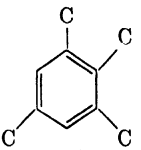
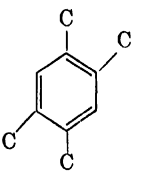
(a) This figure is given as a freezing point in literature.
(b) This pressure is the average of two determinations.
(c) This density is the average of two or more determinations.
(d) This refractive index is the average of two or more determinations.
(e) This temperature is the average of two determinations.

1,2-Diethylbenzene 	**184.4**			
	185 [119]	0.866 [119]	1.50257 22° [62]	
	184–184.5 [222]	0.8662 18° [222]	1.49851 $n_{H\alpha}^{22}$ [62]	
	184 [74]	0.8680 15.0° [74]	1.51326 $n_{H\beta}^{22}$ [62]	
	66–67 12 [62]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3-Diethylbenzene 				
	180.7	**0.8607**	**1.4946**	
	182 [119]	0.860 [119]	1.4905 [90]	
	180–182 [221]	0.8602 [221]	1.4955 [39]	
	176–181 [204]	0.8597 D_{25}^{25} [39]	1.4926 25° [39]	
	180.55 [39]	0.8635 23° [90]	1.4978 16° [239]	
	178–180 [90]	0.860 D_{20}^{20} [135]	1.4998 10° [39]	
	176–179 [4]	0.8636 D_{17}^{17} [239]		
	179–181 715 [239]	0.8798 D_0^0 [39]		
	15.7 0.74 [134]			
	10.8 0.43 [134]			
	6.8 0.30 [134]			
	−0.8 0.15 [134]			
* $\frac{dD}{dt} = -0.0007619$/°C (0 to 25°C)				
† $\frac{dn}{dt} = -0.0005136$/°C (10 to 25°C)				
1,4-Diethylbenzene 				
	182.8	**0.8633**	**1.4969**	
−35 [59]	183 [119,157,214]	0.8640 [228]	1.49671 [110,216]	
	182–183 [118,223]	0.865 [119]	1.4973 [214]	
	182 [59]	0.865 D_{20}^{20} [135]	1.4974 [228]	
	181–182 [10]	0.8645 18.2° [57]	1.4949 25° [157]	
	181.8 [228]	0.8622 18° [223]	1.49897 16.2° [214]	
	6.2 1.35 [134]	0.8678 16.3° [214]	1.4978 14° [108]	
	−0.7 0.83 [134]	0.8679 16.2° [214]	1.50341 5.0° [216]	
	−5.6 0.54 [134]	0.8675 14° [108]	1.49224 $n_{H\alpha}^{18.2}$ [57]	
	−6.7 0.49 [134]		1.49499 $n_{H\alpha}^{16.2}$ [214]	
			1.50665 $n_{H\beta}^{18.2}$ [57]	
			1.50993 $n_{H\beta}^{16.2}$ [214]	
			1.51924 $n_{H\gamma}^{16.2}$ [214]	
* $\frac{dD}{dt} = -0.0008340$/°C (14 to 20°C)				
† $\frac{dn}{dt} = -0.00044095$/°C (5 to 25°C)				

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1,3-Dimethyl-2-ethylbenzene 							
	80–83	24 [195]			1.5040	24.0° [195]	
1,2-Dimethyl-4-ethylbenzene 							
	187.6						
	189 [9,116]		0.8704 [116]		1.5026 [217]		
	187–188 [201]		0.873 [217]		1.5027 [217]		
	187.6 [228]		0.8792 [228]		1.5030 [217]		
	186–187 [217]		0.8777	15.2° [217]	1.5046 [228]		
	78–80	15 [217]	0.8776	15.05° [217]	1.50489	15.05° [217]	
			0.8782	15.0° [217]	1.50526	15.0° [217]	
					1.50103	$n_{H\alpha}^{15.05}$ [217]	
					1.50142	$n_{H\alpha}^{15.0}$ [217]	
					1.51606	$n_{H\beta}^{15.05}$ [217]	
					1.51647	$n_{H\beta}^{15.0}$ [217]	
					1.52531	$n_{H\gamma}^{15.05}$ [217]	
					1.52584	$n_{H\gamma}^{15.0}$ [217]	
1,4-Dimethyl-2-ethylbenzene 							
	185.4						
	185–187 [24]		0.8750	22° [61]	1.5051	22° [61]	
	185–186 [61]		0.8824	17° [108]	1.5026	17° [108]	
	185 [96,201]						
	183–185 [118]						
	183–184 [233]						
	185.5	759 [108]					
	64	10 [108]					

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Ethyl-2,4-dimethylbenzene 				
	185.6			
	186–187 [7]	0.8686 [7]	1.5033 16° [108]	
	186 [8]	0.8772 16° [108]		
	185–186 [201]			
	184–186 [96]			
	184 [162]			
	184–185 754 [108]			
	67–68 12 [108]			
1,3-Dimethyl-5-ethylbenzene 				
	184.3			
	185 [224]	0.861 [224]		
	184–184.6 [155]	0.8644 [91]		
	180–182 [91]			
1,2,3,4-Tetramethylbenzene (Prehnitene) 				
−6.5	**205.0**		**1.5194_5**	
−4 [83,95,191]	205.04 [141]	0.9010 [150]	1.5185 [214]	
−4.9 [153]	205.0 [173]	0.901 [119,214]	1.51865 [110,216]	
−5 [211]	204.5 [187]	0.904 [154]	1.52013 [141]	
−6.4 [187,196]	204.0 [158]	0.9053 [141]	1.5202 [192]	
−6.8 [197]	204 [95,119,122,154,211]	0.9015 25° [141]	1.5203 [150]	
−7.1 – −7.0 [192]	203–204 [214]	0.9044 16.0° [214]	1.51811 25° [141]	
−7.1 [193]	203 [150]	0.905 $D_{15.5}^{15.5}$ [153]	1.52031 16.0° [214]	
−7.7 [86,158]	158.46 217.2 [141]		1.52454 6.3° [216]	
	119.40 57.3 [141]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,3,4-Tetramethylbenzene (Prehnitene) *(Continued)*			1.51362 $n_{H\alpha}^{25}$ [141] 1.51563 $n_{H\alpha}^{20}$ [141] 1.51621 $n_{H\alpha}^{16.0}$ [214] 1.52923 $n_{H\beta}^{25}$ [141] 1.53133 $n_{H\beta}^{20}$ [141] 1.53192 $n_{H\beta}^{16.0}$ [214] 1.54189 $n_{H\gamma}^{16.0}$ [214]	*
	96.5 25 [192] 97–98 24–25 [196]			
* $\frac{dn}{dt} = -0.0003553$/°C (6 to 25°C)				
1,2,3,5-Tetramethylbenzene (Isodurene) 				
−24.2	**197.2**			
−24.0 ± 0.1(a) [197] −24.0 [158] −24.1 [192] −24.5 [86] −28.7 [153]	198.0–198.6 [109] 198.0 [137] 197.0 [65,153] 196–197 [37,99] 195–197 [20,21,52,145] 195 [93,123,154] 84.6–84.7 17 [197] 78.8–79.2 11 [109]	0.8906 [52] 0.895 [154] 0.896 [65] 0.899 15.5° [153]	1.5134 [192] 1.51126 n_{He}^{20} [68]	
(a) This figure is given as a freezing point in the literature.				
1,2,4,5-Tetramethylbenzene (Durene) 				
79.7	**195.4**			
82–83 [116] 81–82 [84] 81 [94] 80–81 [187,229] 80(a) 79–80(b) 79.3–79.9 [197] 79.5 [234] 79.3 [158]	196.2–196.4 [109] 196 [95,187,229] 195.8 [137] 195 [16] 193–195 [2,3,72] 194.0 [153] 193 [154] 192 [123] 191–192 [67]	0.736 210.2° [49] 0.820 108.5° [49] 0.8380 81.3° [57] 0.838 $D_{15.5}^{15.5}$ [153] 1.03 (solid) [171,172] 1.034 (solid) [114]	1.47896 $n_{H\alpha}^{81.3}$ [57] 1.49369 $n_{H\beta}^{81.3}$ [57]	Crit. Temp. (°C) 402.5 [49,73] Crit. Pressure (mm Hg) 21,736.0 [73]

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}	n_D^{20}	Additional Data
1,2,4,5-Tetramethylbenzene (Durene) (*Continued*)					
79 [6,37,52]	190–191 [52]				
78–79 [192]	190 [97,212]				
78.9 [58]	1.3	0.033 [134]			
78.7 [109]	−1.3	0.016 [134]			
	−1.7	0.013 [134]			

(a) The melting point 80 is found in references 67, 92, 97, 153, 170, 171, 172, 194, 219.
(b) The melting point 79-80 is found in references 2, 3, 45, 60, 63, 98, 154, 199A, 203, 212, 215, 217.

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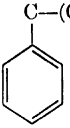
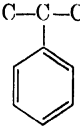
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
	C—(C)$_3$—C 			*
n-Pentylbenzene (n-Amylbenzene)	**202.2**	**0.8627**	**1.4919**	
−78.25 [101]	205.3 ± 0.1 [101]	0.8585 [61]	1.4883 [42]	
	205 [42]	0.8600 [91,92]	1.4887 [91,92]	
	204–205 [45,98]	0.8662 [127]	1.4920 [45]	
	204–204.5 [61]	0.8039 94.8° [45]	1.4943 [127]	
	202 [60]	0.8233 69.8° [45]	1.4830 40° [45]	
	200.8–201.0 [101]	0.8384 50.5° [45]	1.4850 35° [45]	
	198–201 [87]	0.8385 49.8° [45]	1.48633 30° [101]	
	201–202 761.2 [84]	0.8541 30.3° [45]	1.4878 30° [45]	
	200–201 755 [17]	0.85100 30° [101]	1.4900 25° [45]	
	201 752 [63]	0.8602 22° [84]	1.4920 19° [21,22]	
	200–202 750 [21,22]	0.8624 D_{22}^{22} [84]	1.49062 15° [101]	
	200–201 745 [17,127]		1.4944 14.8° [45]	
	200	0.862 D_{20}^{20} [67]	1.48240 $n_{H\alpha}^{25}$ [101]	
	−200.5 744 [68]	0.8665 19° [21,22]	1.48674 $n_{H\alpha}^{15}$ [101]	
	201.7	0.8662 15.56° [98]		
	−203.7 743 [13]	0.8651 15.5° [84]	1.49572 $n_{H\beta}^{25}$ [101]	
	200.5		1.50006 $n_{H\beta}^{15}$ [101]	
	−201.5 743 [114]	0.8664 $D_{15.5}^{15.5}$ [84]	1.50394 $n_{H\gamma}^{25}$ [101]	
	200–201 713 [115]	0.86261 15°[101]	1.50834 $n_{H\gamma}^{15}$ [101]	
	199–201 729 [115]	0.8681 11.5° [45]	(a)	
	197 720 [115]	0.8702 9.2° [45]		
	87 12 [92]	0.87411 0° [101]		
	81 10 [136]			
	77–78 9 [45,98]			

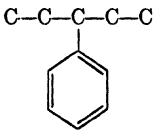
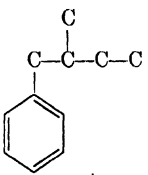
* $\frac{dD}{dt} = -0.00077907[1 + 0.0003548(t - 20)]/°C$ (9 to 95°C)

† $\frac{dD}{dt} = -0.00072298/°C$ (9 to 31°C)

‡ $\frac{dn}{dt} = -0.0004456/°C$ (14 to 40°C)

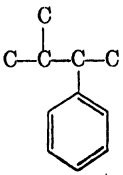
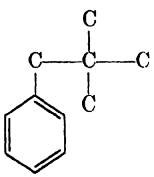
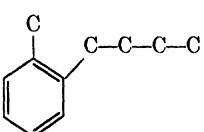
(a) Refractive indices at other lines are found in reference 101.

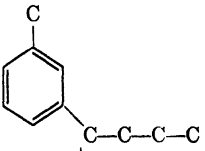
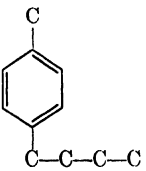
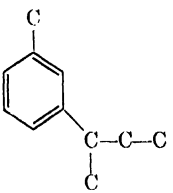
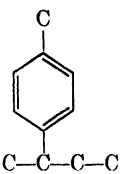
	C—C—C—C—C 			
2-Phenylpentane	**191.6**			
	190–194 [113]	0.8529 [97]	1.4852 [42]	
	192–193 [42]	0.8550 [97]	1.4853 [97]	
	191–193 [17]	0.8576 [42]	1.4858 [97]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Phenylpentane (*Continued*)	191–192 [111] 191 [47] 193–195 772 [75] 191–193 762 [40] 194–195 755.5 [97] 191–193 755 [17] 195.8 –197.2 753.8 [97] 191–192 750 [21,22] 189–190 744 [119]	0.860 [116] 0.8621 [119] 0.8566 17° [21,22]	1.4890 [119] 1.4902 25° [111] 1.4850 17.9° [116] 1.4845 17° [21,22]	
3-Phenylpentane 	190–191 [42] 187.5 [10] 178–182 [20] 180 [65] 186–188 755 [17] 187 753 [17,48] 187–188 752 5 [22] 185–188 750 [109] 189–191 741 [40] 83–85 22 [109] 73–74 12 [48]	0.8649 [42] 0.8744 21° [20] 0.8742 19° [22] 0.8755 15° [48]	1.4880 [42] 1.4868 25° [65] 1.4973 19° [22] 1 4988 16° [48]	
1-Phenyl-2-methylbutane 	**193.8** 194–195 [42] 194(a) [66] 193 [82] 192–193 730 [110] 192–193 715 [31] 190 710 [12] 80(a) 20 [66] 102 15 [24] 113–115 11 [135]	0.8584 [42] 0.8680 [135] 0.855(a) 25° [64] 0.8571(b) 25° [88] 0.8576 25° [82] 0.859 25° [66]	1.4873 [42] 1.4849(a) 25° [64] 1.4870(b) 25° [88] 1.4884 25° [82]	$[\alpha]_D^{25}$ = +1.80° [66] $[\alpha]_D^{25}$ = +1.25° [64] (c)

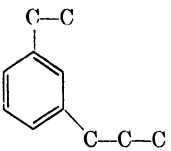
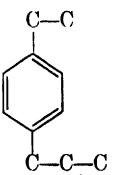
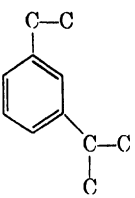
(a) This constant was determined on the *dextro*rotatary form.
(b) This constant was determined on the *levo*rotatory form.
(c) The angle of rotation at various wave lengths is given for the *levo*rotatory compound in reference 88.

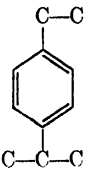
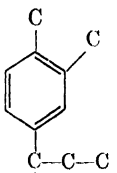
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-3-methylbutane (Isoamylbenzene)	**193.4**			
	197–199 [42]	0.856 [30]	1.4835 [42]	
	194 [60]	0.8620 D_{20}^{20} [18]	1.4867 15.6° [49,73]	
	193–194 [19]	0.885 18° [19]		
	193 [1,71,73,89]	0.8627 15.6° [49]		
	198–199 757 [18,49]			
	195 755.5 [68]			
	193 736 [94]			
	195–196 735 [96]			
2-Methyl-2-phenylbutane (*tert*-Pentylbenzene)	**189.6**			
	190–191 [42]	0.86248 [4]	1.4920 [35,38]	
	189–191 [38,55,120]	0.8660 [35]	1.4934 [42]	
	189–190 [11,33]	0.8720 [39]	1.4860 25° [82]	
	188–190 [108]	0.8737 [42]	1.5032 24° [108]	
	189 [82]	0.8550 25° [82]	1.49154 23° [38]	
	185–187 [61]	0.864 24° [108]		
	186–189 747 [109]	0.8657 21.5° [33]		
	189–191 745 [39]	0.866 D_{20}^{20} [67]		
	187.5 –189.5 737 [95]	0.8740 D_0^{20} [55]		
	191–192 735 [35]	0.8683 15° [95]		
	77 15 [4]	0.8736 15° [95]		
	78–82 14 [109]	0.8741 15° [38]		
	71–74 12 [103]	0.8889 D_0^{0} [55]		
	71–72 12 [102]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Methyl-3-phenylbutane 				
	186 [42] 184 [41] 188–189 753 [48]	0.8795 [41,42] 0.8672 16° [48]	1.4882 [41,42] 1.4972 16° [48]	
1-Phenyl-2,2-dimethylpropane 				
		0.8569		
	186–188 [32] 185–186 [42] 185.6– –186.0 757.6 [14] 185.5 –185.9 756.6 [15]	0.8583 [42] 0.7987 91.9° [15] 0.8114 76.3° [15] 0.8192 66.7° [15] 0.8309 52.1° [15] 0.8386 42.5° [15] 0.8483 30.3° [15] 0.8565 20.2° [15] 0.8581 18.3° [14] 0.8647 10° [15] 0.8727 0° [15]	1.4885 [42] 1.48837 18.3° [14]	
* $\frac{dD}{dt} = -0.00080231[1+0.0002766(t-20)]$/°C (0 to 92°C)				
1-Methyl-2-*n*-butylbenzene 				
	200–201 [77] 170– –170.5 743.1 [56]	0.874 D_{20}^{20} [67] 0.87135 18.3° [77]	1.49662 18.3° [77] 1.49423 17° [56]	

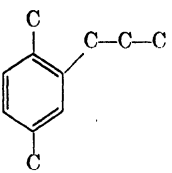
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-3-*n*-butylbenzene 				
	197–198 [34,77]	0.869 D_{20}^{20} [67] 0.86354 18.4° [77] 0.865 D_{15}^{15} [34]	1.49315 18.4° [77]	
1-Methyl-4-*n*-butylbenzene 				
	198.4			
−85 [93]	197–200 [74] 198–199 [77] 197–199 [100] 192 −192.5 742 [56] 82.7–83.3 13 [93]	0.8586 [93] 0.860 D_{20}^{20} [67] 0.8651 D_{20}^{20} [100] 0.8618 14.2° [77]	1.4916 [93] 1.4940 [100] 1.493565 17° [56] 1.4912 14.2° [77] 1.5009 14° [74]	
1-Methyl-3-*sec*-butylbenzene 				
	194–198 [99] 193–197 [6]		1.4957 [6]	
1-Methyl-4-*sec*-butylbenzene 				
	201–202 [6] 196–197 [130,131] 195–197 [99] 80 19 [35]	0.8665 [35] 0.8640 19° [130,131]	1.4938 [35] 1.4950 [6] 1.4917 19° [130,131]	

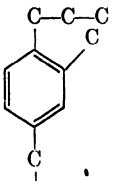
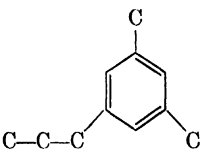
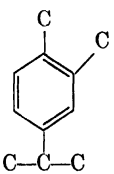
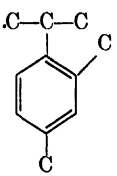
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-3-isobutylbenzene	186–188 [46] 184–185 [26]			
1-Methyl-4-isobutylbenzene	200–205 [76]			
1-Methyl-3-*tert*-butylbenzene	188.5–190 [99] 185–187 [7]			
1-Methyl-4-*tert*-butylbenzene	**190.25**	**0.8621**	**1.4915**	
	192–193 [59]	0.861 [124]	1.4916 [124]	
	189–193 [38]	0.8628 [35]	1.49187 [59]	
	190 [16,122,124]	0.85968 25° [62]	1.4919 [35,103]	
	190–192 751 [8]		1.4922 [5]	

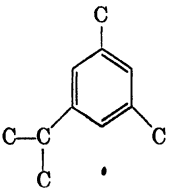
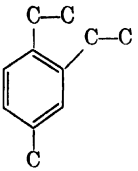
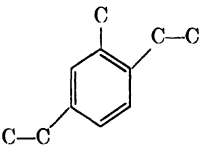
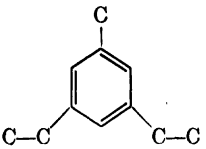
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-4-*tert*-butylbenzene (*Continued*)	189.8 746 [5] 188 740 [103] 186–187 735 [35] 94 25 [122] 76 15 [62] 72–72.5 12 [103]	0.8614 D_{20}^{20} [59] 0.86272 19° [62] 0.8667 13.25° [124] 0.8771 0° [122]	1.4940 [38] 1.489008 25° [62] 1.49465 13.25° [124] 1.48709 $n_{H\alpha}^{20}$ [59] 1.49118 $n_{H\alpha}^{13.25}$ [124] 1.50175 $n_{H\beta}^{20}$ [59] 1.50513 $n_{H\beta}^{13.25}$ [124] 1.51006 $n_{H\gamma}^{20}$ [59] 1.51400 $n_{H\gamma}^{13.25}$ [124]	
* $\frac{dD}{dt} = -0.0007287/°C$ (0 to 25°C) † $\frac{dn}{dt} = -0.0004940/°C$ (13 to 25°C)				
1-Ethyl-3-*n*-propylbenzene 	193–195 [85,86]	0.8588 19° [85]		
1-Ethyl-4-*n*-propylbenzene 	199–200 [128] 202–205 765 [132]	0.867 19° [132]		
1-Ethyl-3-isopropylbenzene 	190–192 [128,133]			

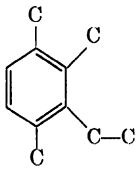
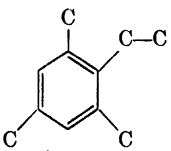
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Ethyl-4-isopropylbenzene 				
	197–198 [128,130,131,133]	0.864 [130,131]	1.4846 [130,131]	
	196 763 [52]	0.8606 16° [52]	1.4928 16° [52]	
	72 10 [52]			
1,2-Dimethyl-4-*n*-propylbenzene 				
	209 [121]	0.8677 15.3° [126]	1.4972(a) [126]	
	202–204 [126]	0.8750 15° [126]	1.49752 15.3° [126]	
		0.8718 12.85° [126]	1.50294 15.1° [126]	
		0.8719 12.7° [126]	1.49881 12.7° [126]	
			1.49390 $n_{H\alpha}^{15.3}$ [126]	
			1.49925 $n_{H\alpha}^{15.1}$ [126]	
			1.49504 $n_{H\alpha}^{12.7}$ [126]	
			1.50804 $n_{H\beta}^{15.3}$ [126]	
			1.51375 $n_{H\beta}^{15.1}$ [126]	
			1.50920 $n_{H\beta}^{12.7}$ [126]	
			1.51681 $n_{H\gamma}^{15.3}$ [126]	
			1.52277 $n_{H\gamma}^{15.1}$ [126]	
			1.51784 $n_{H\gamma}^{12.7}$ [126]	

(a) This refractive index is an average of two or more determinations.

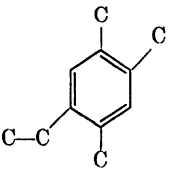
1,4-Dimethyl-2-*n*-propylbenzene 				
	206–207 [121]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-*n*-Propyl-2,4-dimethylbenzene 	208–208.5 [121] 206–207 735 [9] 95 23 [78] 90 18 [9]	0.8786 19° [9]	1.4995 25° [78] 1.501 19° [9]	
1,3-Dimethyl-5-*n*-propylbenzene 	206–210 [121] 90–91 18 [78]		1.4913 25° [78]	
1,2,-Dimethyl-4-isopropylbenzene 	199 [57] 198 732 [50] 86–87.5 16 [50]	0.8710 [57] 0.8729 21.1° [50] 0.8740 15.5° [51]	1.4991 21.1° [50] 1.50001 15.5° [51] 1.49601 $n_{H\alpha}^{15.5}$ [51] 1.51030 $n_{H\beta}^{15.5}$ [51] 1.51913 $n_{H\gamma}^{15.5}$ [51]	
1-Isopropyl-2,4-dimethylbenzene 	194–195 [121] 77 13 [78,79]		1.4998 25° [78,79]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3-Dimethyl-5-isopropylbenzene 	83–85 17 [78]		1.4935 25° [78]	
1,2-Diethyl-4-methylbenzene 	200–203 [58]			
1-Methyl-2,5-diethylbenzene 	205–207 [70]			
1-Methyl-3,5-diethylbenzene 	199.8–201.9 [72] 199.8–200 [81] 198–200 [43]	0.8790 [43]		

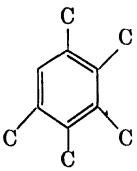
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,4-Trimethyl-3-ethylbenzene 			**1.5132**	*
	214 725 [106]	0.900 D_{20}^{20} [106]	1.5133 [106] 1.5088 30° [106] 1.5098 28° [106] 1.5106 26° [106] 1.5115 24° [106] 1.5124 22° [106] 1.5142 18° [106] 1.5150 16° [106] 1.5167 12° [106] 1.5185 8° [106] 1.5202 4° [106] 1.5218 0° [106]	
* $\frac{dn}{dt} = -0.0004335$/°C (0 to 30°C)				
1,3,5-Trimethyl-2-ethylbenzene 			**1.5080**	*
−15.56(a) [106]	212–214 [134] 207–209 [117] 207–208 755 [52] 210.2 753 [123] 210 725 [106] 93–94 16 [52]	0.866 [123] 0.894 D_{20}^{20} [106] 0.8907 18.5° [52] 0.8885 16.35° [123]	1.5074 [106] 1.5111 [123] 1.51167 [54A,125] 1.5028 30° [106] 1.5039 28° [106] 1.5048 26° [106] 1.5057 24° [106] 1.5066 22° [106] 1.5091 18.5° [52] 1.5082 18° [106] 1.51274 16.35° [123] 1.5091 16° [106] 1.5110 12° [106] 1.5129 8° [106] 1.5147 4° [106] 1.5161 0° [106] 1.50875 $n_{H\alpha}^{16.35}$ [123] 1.52416 $n_{H\beta}^{16.35}$ [123] 1.53376 $n_{H\gamma}^{16.35}$ [123]	
* $\frac{dn}{dt} = -0.0004397$/°C (0 to 30°C)				

(a) This figure is given as a freezing point in the literature.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}		n_D^{20}		Additional Data
1,2,4-Trimethyl-5-ethylbenzene 						
				1.5079		
−13.58(a) [106]	211 [123,126]	0.889	D_{20}^{20} [106]	1.5075 [106]		
	206–208 [118,134]	0.8866	15.85° [123]	1.5086 [123,126]		
	208 758 [52]	0.8867	15.75° [123]	1.5111 [126]		
	210 725 [106]	0.8890	14° [52]	1.5029	30° [106]	
	91–93 15 [126]	0.8937	12.15° [126]	1.5039	28° [106]	
	88 13 [52]	0.8938	12.05° [126]	1.5049	26° [106]	
				1.5057	24° [106]	
				1.5066	22° [106]	
				1.5084	18° [106]	
				1.5094	16° [106]	
				1.51047	15.75° [123]	
				1.5077	14° [52]	
				1.51474	12.05° [126]	
				1.5113	12° [106]	
				1.5128	8° [106]	
				1.5145	4° [106]	
				1.5161	0° [106]	
				1.50654	$n_{H\alpha}^{15.75}$ [123]	
				1.51078	$n_{H\alpha}^{12.05}$ [126]	
				1.52163	$n_{H\beta}^{15.75}$ [123]	
				1.52580	$n_{H\beta}^{12.05}$ [126]	
				1.53112	$n_{H\gamma}^{15.75}$ [123]	
				1.53481	$n_{H\gamma}^{12.05}$ [126]	

* $\frac{dn}{dt} = -0.0004401$/°C (0 to 30°C)

(a) This figure is given as a freezing point in the literature.

Pentamethylbenzene 						
53.0	**231.4**	**0.8580**	**100°**			Crit. Temp. (°C)
54.3 [28]	231.9 [69]	0.7735	207.4° [25]	1.5287 [126]		456 [129]
52.2–53.1 [107]	231 [44,60]	0.7822	197.0° [25]	1.50489	72.8° [126]	
53 [23,29,37]	230–230.5 [54]	0.8131	157.8° [25]	1.48484	$n_{H\alpha}^{107.2}$ [27]	
52–53 [36]	230 [2,105,129]	0.8514	108.1° [25]	1.50104	$n_{H\alpha}^{72.8}$ [126]	
52 [104,105]	229 [29]	0.8516	107.8° [25]			

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
Pentamethylbenzene (*Continued*)			0.8472	107.2° [27]	1.49932	$n_{H\beta}^{107.2}$ [27]	
			0.8757	75.5° [25]	1.51609	$n_{H\beta}^{72.8}$ [126]	
			0.8780	73.5° [126]			
51.5 [44,54,112]	127–129	20 [105]	0.8786	72.8° [126]			
51 [90]	108	15 [126]	1.018	0° [137]			
50–51 [126]	104.0						
	−104.2	11 [54]					

* $\frac{dD}{dt} = -0.00074175[1+0.001133(t-100)]/°C$ (72 to 208°C)

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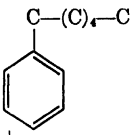
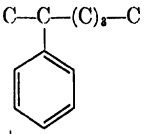
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
n-Hexylbenzene 				
	226.2	**0.8602**	**1.4890**	
−66.8 [107]	224–228 [133]	0.8592 [101,102]	1.4868 [101,102]	
	227.35 ± 0.1 [107]	0.8613 [131]	1.490 [131]	
	226–227 [50,106]	0.862 [36]	1.4902 [50]	
	219–223 [121]	0.8027 94.8° [50]	1.4811 40° [50]	
	219–220 [131]	0.8223 69.7° [50]	1.4860 30° [50]	
	219 [94]	0.8371 49.8° [50]	1.48718 25° [107]	
	219–222 768 [53]	0.8524 30° [102]	1.4881 25° [50]	
	218–221 750 [21]	0.85259 30° [107]	1.49132 15° [107]	
	218–220 750 [22]	0.8526 29.7° [50]	1.492 15° [16]	
	223.8	0.8646 15.56° [106]	1.48341 $n_{H\alpha}^{25}$ [107]	
	−224.0 748 [107]	0.86394 15° [107]	1.48745 $n_{H\alpha}^{15}$ [107]	
	216–218 720 [120]	0.869 15° [16]	1.49660 $n_{H\beta}^{25}$ [107]	
	97.5–101 12 [102]	0.8685 9.0° [50]	1.50092 $n_{H\beta}^{15}$ [107]	
	93–94 9 [50,106]	0.87527 0° [107]	1.50547 $n_{H\gamma}^{25}$ [107]	
			1.50976 $n_{H\gamma}^{15}$ [107]	
			(a)	

* $\frac{dD}{dt} = -0.0007684/°C$ (0 to 95°C)

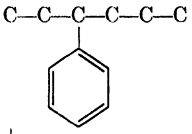
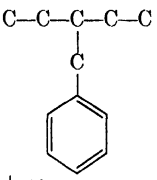
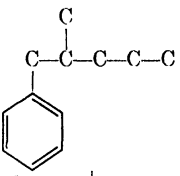
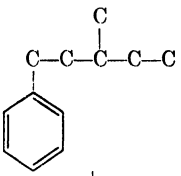
† $\frac{dn}{dt} = -0.0003751/°C$ (15 to 40°C)

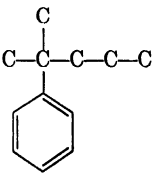
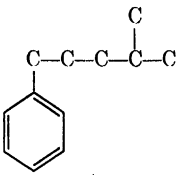
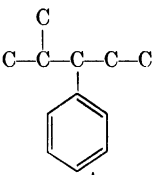
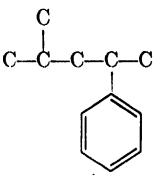
(a) Refractive indices of other lines are found in reference 107.

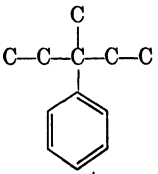
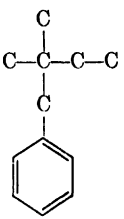
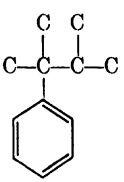
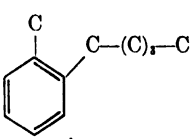
2-Phenylhexane 				
		0.8612		
	208 [15]	0.855(a) 25° [72]	1.4902 25° [117]	$[\alpha]_D^{25}$ = +1.96°(a) [7]
	206–207 [117]	0.8581 23.5° [121]	1.4860 17.9° [121]	
	210–211 737 [45]	0.869 15° [15]	1.492 15° [15]	
	100(a) 22 [72]	0.8760 4° [121]		

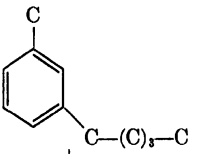
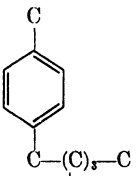
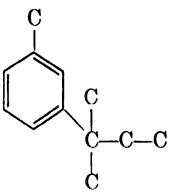
* $\frac{dD}{dt} = -0.0009412/°C$ (4 to 25°C)

(a) This constant was determined on the *dextro*rotatory form.

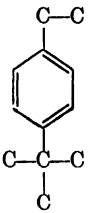
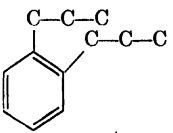
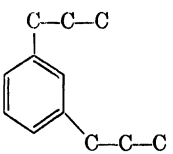
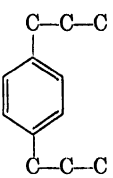
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Phenylhexane 	209–212 [114] 106–107 30 [114] 105(a) 27 [72] 103(a) 25 [72] 95–96 18 [114] 65–66 2 [114]	0.8524(b) D_{20}^{25} [114] 0.863(a) 24° [72]	1.4859(c) [114]	$[\alpha]_D^{24}$ = +0.565°(a) (d) [72]
(a) This constant was determined on the *dextro*rotatory form. (b) This density is the average of two or more determinations. (c) This refractive index is the average of two or more determinations. (d) This angle of rotation is the average of two or more determinations.				
3-Benzylpentane 	216.5 –217 735 [115]			
1-Phenyl-2-methylpentane 	203–207 [13,115] 214 740 [116] 110 25 [25]	0.8584 25° [13]	1.48273 [13]	
1-Phenyl-3-methylpentane 	219–220 [115] 220(b) 757 [61] 219 740 [116] 112(a) 15 [73] 90–91(b) 9 [61]	0.855(a) 25° [73] 0.8585(a) 25° [99] 0.8644(b) 14.5° [61]	1.4859(a) 25° [99] 1.4896(b) 14.5° [61]	$[\alpha]_D^{25}$ = −2.94° [73] $[\alpha]_D^{14.5}$ = +17.20° [61] (b) (c)
(a) This constant was determined on the *levo*rotatory form. (b) This constant was determined on the *dextro*rotatary form. (c) The angle of rotation at various wave lengths is given in reference 99.				

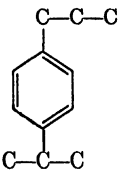
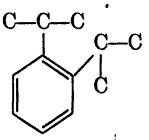
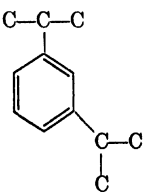
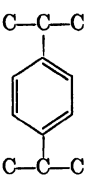
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Methyl-2-phenylpentane 	205–206 [105] 205–206 745 [44]	0.8718 [44] 0.8796 10° [105]	1.49554 16.5° [105]	
1-Phenyl-4-methylpentane 	214–215 [3] 212–213 733 [104]	0.8568 16° [104]		
2-Methyl-3-phenylpentane 	200 [1]			
2-Methyl-4-phenylpentane 	197 [9,56] 197–198 735 [45] 84 13 [56] 77 9 [56]	0.863 15° [9] 0.8634 15° [56]	1.4876 15° [9,56]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Methyl-3-phenylpentane 	204–206 [105] 205–206 745 [44] 86–88 15 [44]	0.8718 [44] 0.8773 15° [105]	1.49724 16.5° [105]	
2-Methyl-2-benzylbutane 	214.5 753 [119]	0.860 19° [119]	1.4882 19° [119]	
2,3-Dimethyl-2-phenylbutane 	209–210 745 [44] 86–87 15 [44]	0.8814 [44]		
1-Methyl-2-*n*-pentylbenzene 		0.874 D_{20}^{20} [75]		

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-3-*n*-pentylbenzene 				
	207–209 [26] 220.5 −222.5 738 [20] 102–106 16.5 [20]	0.8679 22° [26] 0.8647 20° [26] 0.861 D_{20}^{20} [75]	1.49046 21.6° [20]	
1-Methyl-4-*n*-pentylbenzene 				
−28 [103]	98.9–99.5 12 [103]	0.857 [75] 0.8582 [103]	1.4904 [103]	
1-Methyl-3-*tert*-pentylbenzene 				
		0.8671		
	208–209 [18] 208.2–208.8 [86]	8673 [18] 0.8082 100° [18] 0.8161 90° [18] 0.8229 80° [18] 0.8304 70° [18] 0.8337 60° [18] 0.8454 50° [18] 0.8524 40° [18] 0.8602 30° [18] 0.8774 10° [18] 0.8817 0° [18] 0.8888 −10° [18] 0.8930 −20° [18]		

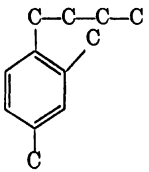
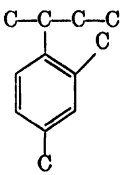
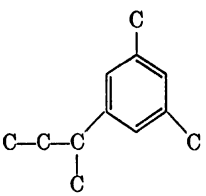
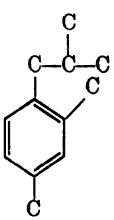
* $\frac{dD}{dt} = -0.00071648[1+0.001016(t-20)]/°C$ (−20 to 100°C)

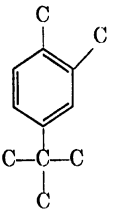
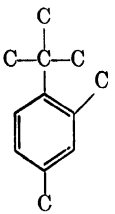
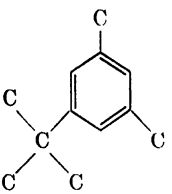
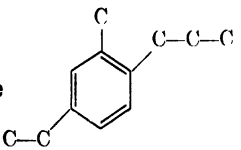
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Ethyl-4-*tert*-butylbenzene 	209–213 [19] 207–208 751 [8]	0.865 D_{20}^{20}	1.4950 [8]	
1,2-Di-*n*-propylbenzene 	184 [38]	0.8770 15.0° [38]		
1,3-Di-*n*-propylbenzene 	215–218 [123A] 105 20 [6]	0.9137 D_{17}^{17} [123A]	1.5155 16° [123A]	
1,4-Di-*n*-propylbenzene 	220–222 [66] 218–220 [65] 220–221 745.45 [29] 109 22 [130] 110 20 [6]	0.856 [130] 0.8563 19.4° [130]	1.48775 $n_{H\alpha}^{19.4}$ [130] 1.50136 $n_{H\beta}^{19.4}$ [130] 1.4914 n_{He}^{20} [130] 1.49167 $n_{He}^{19.4}$ [130]	

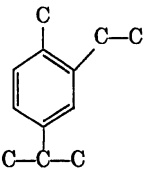
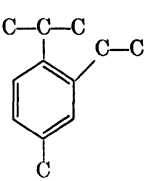
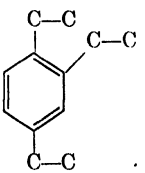
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-*n*-Propyl-4-isopropylbenzene 	213.5 −215.5 745.45 [28] 210 731 [11]	0.871 8° [11]	1.502 8° [11]	
1,2-Diisopropylbenzene 	209 [124]			
1,3-Diisopropylbenzene 	203.5–204.5 [10] 204 [51,124] 203.0 [83] 203–205 766 [35] 75–76 9 [51]	0.8566 [83] 0.8596 [51] 0.8484 30° [83]	1.4884 [83] 1.4838 30° [83]	
1,4-Diisopropylbenzene 	**208.9** 210.3 [83] 210 [84] 205–210 [79] 204.5 [91] 205.5–206.5 755 [46] 85–86 14 [84]	**0.8576_5** 0.8571 [83] 0.8494 30° [83] 0.8550 25° [91] 0.860 14° [54]	**1.4900** 1.4895 [83] 1.4907 [47] 1.4850 30° [83] 1.4892 25° [91] 1.492 16° [54]	

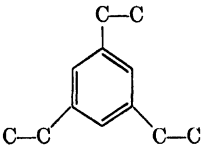
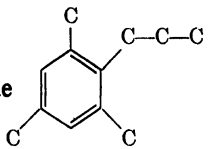
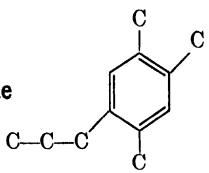
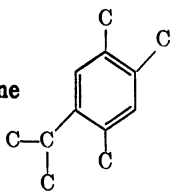
* $\frac{dD}{dt} = -0.0007651/°C$ (14 to 30°C)

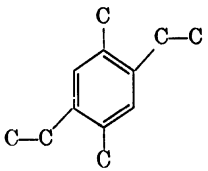
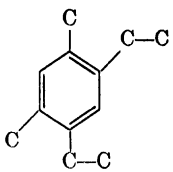
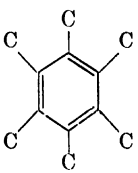
† $\frac{dn}{dt} = -0.0004736/°C$ (16 to 30°C)

M. P.,°C	B. P.,°C @ 760mm	D_4^2	n_D^{20}	Additional Data
1-*n*-Butyl-2,4-dimethylbenzene 	96 8 [85]	0.8728 D_{20}^{20} [85]	1.4972 25° [85]	
1-*sec*-Butyl-2,4-dimethylbenzene 	84 8 [85]	0.8680 D_{20}^{20} [85]	1.4939 25° [85]	
1,3-Dimethyl-5-*sec*-butylbenzene 	98 15 [85]	0.8631 D_{20}^{20} [85]	1.4920 25° [85]	
1-Isobutyl-2,4-dimethylbenzene 	96 15 [85]	0.8704 D_{20}^{20} [85]	1.4974 25° [85]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Dimethyl-4-*tert*-butylbenzene 				
	83–85 3 [84]		1.4970 25° [84]	
1-*tert*-Butyl-2,4-dimethylbenzene 				
−31 [85]	210–214 [112]			
	113–114 28 [112]	0.9372 30° [112]	1.5030 37° [112]	
	86 12 [85]	0.8634 D_{20}^{20} [85]	1.4909 25° [85]	
1,3-Dimethyl-5-*tert*-butylbenzene 				
	205.1		**1.4958**	
−21.5 [85]	205.5–206.5 [90]	0.8619 30° [112]	1.4890 37° [112]	
	204–206 [76]	0.8671 D_{20}^{20} [85]	1.4935 25° [85]	
	200–202 [112]	0.870 15° [76]	1.4980 15° [76]	
	203–206 756 [71]			
	200–202 747 [7]			
	85 11 [27]			
* $\frac{dn}{dt} = -0.00040797$/°C (15 to 37°C)				
1-Methyl-2-*n*-propyl-5-ethylbenzene 				
	213–215 [78]	0.8831 11° [78]		

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}		n_D^{20}		Additional Data
-Methyl-2-ethyl-4-isopropylbenzene 						*
		0.8673				
	204 [127]	0.8665	21.1° [57]	1.4965	21.1° [57]	
	214 754 [57]	0.8706	15.7° [58]	1.49878	15.6° [58]	
	104–105 21 [127]	0.8708	15.6° [58]	1.49670	15° [58]	
	103 19 [57]			1.49494	$n_{H\alpha}^{15.6}$ [58]	
	100 17 [58]			1.49275	$n_{H\alpha}^{15}$ [58]	
				1.50878	$n_{H\beta}^{15.6}$ [58]	
				1.50669	$n_{H\beta}^{15}$ [58]	
				1.51739	$n_{H\gamma}^{15.6}$ [58]	
$\frac{dD}{dt} = -0.00077095/°C$ (15 to 21°C)				1.51530	$n_{H\gamma}^{15}$ [58]	
-Isopropyl-2-ethyl-4-methylbenzene 						
	209–213 [128]	0.8756	15.7° [128]	1.49819	$n_{H\alpha}^{15.7}$ [128]	
				1.51229	$n_{H\beta}^{15.7}$ [128]	
				1.52096	$n_{H\gamma}^{15.7}$ [128]	
				1.50227	$n_{He}^{15.7}$ [128]	
,2,4-Triethylbenzene 						
86–87 [109]	218 [69]	0.882 [69]		1.4983	17° [60]	
	216–218 [59]	0.8819	17° [60]			
	217–218 755 [60]					
	99 15 [60]					

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3,5-Triethylbenzene 				*
	216.2	**0.8624**		
100–102 [109]	218 [34,69]	0.863 [69]	1.4951 [60]	
	217.04 [132]	0.8633 [55]	1.4956 18.1° [87]	
	217 [55]	0.8655 [132]		
	215.2–216.2 [89]	0.8568 25° [23]		
	215.4 [88]	0.8636 17° [60]		
	215–215.2 [89]	0.8772 0° [23]		
	214 765 [81]			
	214.8 755.1 [87]			
	215 755 [60]			
	95 14 [60]			
	66 4 [81]			
* $\frac{dD}{dt} = -0.0008372$/°C (0 to 25°C)				
1,3,5-Trimethyl-2-*n*-propylbenzene 				
	220–221 [62,123]	0.8757 25° [62] 0.8773 20° [123]	1.5009 25° [62]	
1,2,4-Trimethyl-5-*n*-propylbenzene 				
	226–228 [42]	0.887 [42]	1.5095 [42]	
1,2,4-Trimethyl-5-isopropylbenzene 				
	221.5–223.5 [129]	0.8795 21° [129]	1.50648 21° [129]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Dimethyl-2,5-diethylbenzene 	104.5–105 15 [30]	0.8803 [30]	1.5091 [30]	
1,5-Dimethyl-2,4-diethylbenzene 	105 15 [96]			
Hexamethylbenzene 				
165.3	**263.8**			
166 [37,48,49,63,126]	265 [37,49,70]	1.072 0° [134]	(b)	
165.5 [5,93,113,122,125]	264–265 [48]	1.020 (solid) [67]		
165 [108]	264 [32,33]	1.042 (solid) [17]		
164–165 [4,64]	263.9 [82]			
164.3–164.8 [111]	263.6 [77]			
164 (a)	263 [31]			
163.5–164 [14]				
163 [2,40]				
162–163 [52,9a]				
162 [110]				

(a) The melting point 164 is found in references 17, 24, 31, 32, 33, 41, 43, 74, 80, 97, 98, 100, 118.
(b) Refractive indices of other lines may be found in reference 12.

$C_{12}H_{18}$ References

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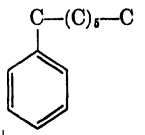
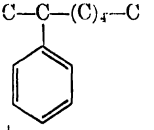
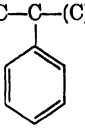
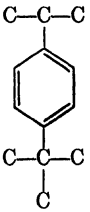
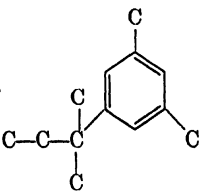
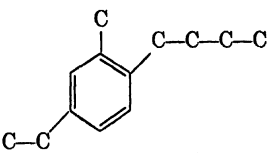
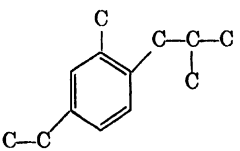
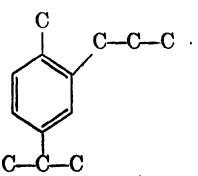
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
n-Heptylbenzene 				*
	237.8	**0.8595**	**1.4884**	
	244–246 [54]	0.8570 [53]	1.4860 [46,47]	
	240–241 [24,49]	0.8590 [46,47]	1.4865 [53]	
	240 [43]	0.8604 [17]	1.4888 [24]	
	232–236 [30]	0.8039 94.8° [24]	1.4800 40° [24]	
	235 [8,53]	0.8221 69.7° [24]	1.4822 35° [24]	
	233 [1]	0.8370 49.8° [24]	1.4845 30° [24]	
	229–231 [52]	0.8522 30° [47]	1.4868 25° [24]	
	233–234 748.5 [31]	0.8520 29.7° [24]	1.4857 18.5° [52]	
	110 15 [1]	0.867 D_{20}^{20} [35]	1.4902 16.5° [24]	
	116–118 12 [47]	0.8637 15.56° [49]	1.48262 $n_{H\alpha}^{20}$ [17]	
	105 12 [30]	0.8678 8.4° [24]	1.49515 $n_{H\beta}^{20}$ [17]	
	110 10 [6]		1.50290 $n_{H\gamma}^{20}$ [17]	
	108–110 10 [29]		1.48640 n_{He}^{20} [17]	
	108–109 9 [24,49]			
* $\frac{dD}{dt} = -0.0007486$/°C (0 to 75°C)				
† $\frac{dn}{dt} = -0.0004125$/°C (16 to 40°C)				
2-Phenylheptane 				
		0.8610		
	229–231 [51]	0.861 [51]	1.4857 18.5° [51]	
	226.5–227.5 [14]	0.8598 21.5° [52]		
		0.8772 0° [52]		
* $\frac{dD}{dt} = -0.0008094$/°C (0 to 22°C)				
3-Phenylheptane 				*
	105(a) 16 [32]	0.8558(b) 25° [42]	1.4871 [20]	$[\alpha]_D^{25} = +0.75°$(a) [33]
	112(a) 15 [33]	0.856(a) 25° [32,33]	1.4848(b) 25° [42]	$[\alpha]_D^{25} = +0.97°$(a) [32]
	68–71 3 [20]	0.8585 D_{25}^{25} [20]		(c)

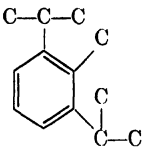
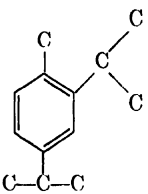
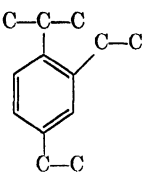
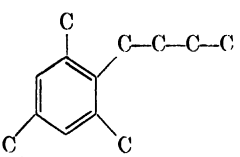
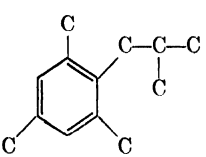
(a) This constant was determined on the *dextro*rotatory form.
(b) This constant was determined on the *levo*rotatory form.
(c) The angle of rotation at various wave lengths is given in reference 42.

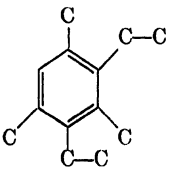
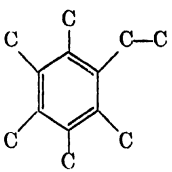
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4-Phenylheptane	221–224 [23]			
3-Benzylhexane	120 24 [15] 117 18 [16]			
2-Methyl-2-phenylhexane	223.5 -224.5 745.6 [22] 107 -107.5 20 [22]	0.8737 [22]		
3-Methyl-3-phenylhexane	106–107 20 [22] 110–112 15 [19] 100 15 [22]	0.8819 [19]	1.4964 [22] 1.49951 15° [19]	
2-Methyl-5-phenylhexane	223 [26]	0.8696 15° [26]		

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Ethyl-3-phenylpentane				*
		0.8679		
	220–222 [48]	0.8786 [22]	1.4975 [22]	
	225–226 757.6 [7]	0.8262 75.1° [7]	1.49211 25° [48]	
	225–226 745 [22]	0.8437 52.2° [7]	1.4953 25° [22]	
	107–108 20 [22]	0.8513 42.5° [7]		
		0.8593 31.2° [7]		
		0.8656 25° [48]		
		0.8692 17.8° [7]		
		0.8747 10.6° [7]		
		0.8826 0° [7]		
* $\frac{dD}{dt} = -0.0007367[1+0.001035(t-20)]/°C$ (0 to 75°C)				
2,3-Dimethyl-2-phenylpentane				
	222–223 745 [22]	0.8801 [22]		
	105–107 20 [22]			
2,4-Dimethyl-2-phenylpentane				
	218 [48]	0.8638 [34]	1.4852 [34]	
	216–217 745.7 [22]	0.8724 [22]	1.49383 16.5° [48]	
	101–102 20 [22]	0.8741 15° [48]		
	101–102 15 [34]			
2,4-Dimethyl-3-phenylpentane				
	220–225 [38,39]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2-Dimethyl-5-phenylpentane	115 9 [21]	0.9443 [21] 0.9460 D_{20}^{20} [21]		
1-Methyl-4-hexylbenzene				
−30.5 [45]	236–238 [37] 115–115.5 12 [45]	0.8569 [45]	1.4890 [45]	
2-*p*-Tolylhexane	162–165 135 [50]	0.855 D_{20}^{25} [50]	1.4910 [50]	
1-Isopropyl-2-*tert*-butylbenzene	208 729 [3]			
1-Isopropyl-3-*tert*-butylbenzene	216 729 [3]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Isopropyl-4-*tert*-butylbenzene 	222 729 [3] 221 727 [2,4] 69 3 [2,4]	0.8648 15° [2,4]	1.4928 [2,4]	
1,3-Dimethyl-5-*tert*-pentylbenzene 	102–103 14 [40]			
1-Methyl-2-*n*-butyl-5-ethylbenzene 	236–237 [36]	0.8862 11° [36]		
1-Methyl-2-isobutyl-5-ethylbenzene 	228–229 [36]	0.8863 11° [36]		
1-Methyl-2-*n*-propyl-4-isopropylbenzene 	225 [9] 226 766 [27] 106–107.5 13 [27]	0.902 17° [9] 0.8685 15° [27]	1.49585 15° [27] 1.49198 $n_{H\alpha}^{15}$ [27] 1.50549 $n_{H\beta}^{15}$ [27] 1.51386 $n_{H\gamma}^{15}$ [27]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3-Diisopropyl-2-methylbenzene 	228.7 770 [13]	0.8768 [13]	1.5040 18° [13]	
1-Methyl-2,4-diisopropylbenzene 	220 [5] 225 770 [12]	0.8664 [12] 0.880 0° [5]	1.499 [12]	
1-Isopropyl-2,4-diethylbenzene 	224–226 [18]			
1,3,5-Trimethyl-2-*n*-butylbenzene 	237–241 [25]			
1,3,5-Trimethyl-2-isobutylbenzene 	228–230 754 [28] 125–127 24 [28]	0.8782 18° [28]	1.5004 18° [28]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3,5-Trimethyl-2,4-diethylbenzene 	229–236 [41]			
Pentamethylethylbenzene 				
125[10,44]				Sublimation Temp. (°C) 118[10,11,44]

$C_{13}H_{20}$ References

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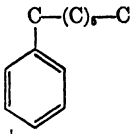
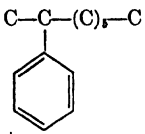
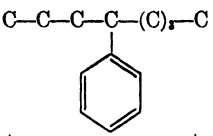
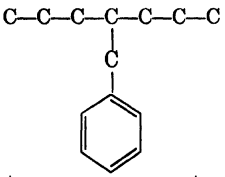
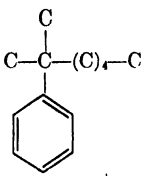
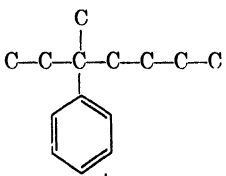
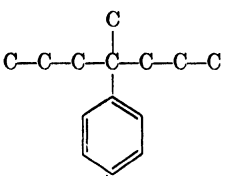
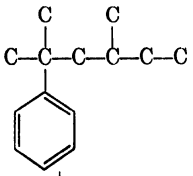
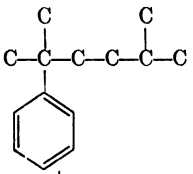
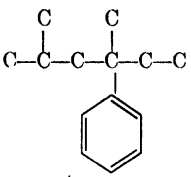
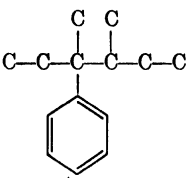
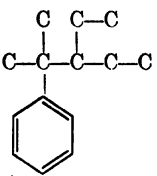
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
n-Octylbenzene 				
	263.6	**0.8582_5**	1.4851 [40,41]	
		0.8582 [40,41]	1.4858 [11]	
−7 [1]	264–265 [12]	0.8583 [12]	1.4861 18.4° [50]	
	262–264 [1]	0.859 [11]	1.48194 $n_{H\alpha}^{20}$ [12]	
	263 [28]	0.8512 30° [41]	1.49437 $n_{H\beta}^{20}$ [12]	
	261–263 [54]	0.8593 20.5° [50]	1.50193 $n_{H\gamma}^{20}$ [12]	
	256–259 761 [11,30]		1.48534 n_{He}^{20} [12]	
	131–134 12 [41]			
	115.5			
	−118.5 9 [50]			
* $\frac{dD}{dt} = -0.0007050$/°C (20 to 30°C)				
2-Phenyloctane 				
		0.8611		
	123–125 20 [52]	0.854 [52]	1.4837 [52]	
	125–127 18 [38]	0.860 [49]	1.4861 18.4° [48,49]	
	115.5	0.8526 D_{50}^{50} [38]	1.48790 17° [38]	
	−118.5 6 [48]	0.859 20.5° [48]		
	115–118 6 [49]	0.8593 20.5° [50]		
		0.8626 D_{17}^{17} [38]		
		0.878 0° [48]		
		0.8782 0° [50]		
* $\frac{dD}{dt} = -0.0007376$/°C (0 to 50°C)				
4-Phenyloctane 				
	119 18 [29]	0.855(a) 25° [29]		$[\alpha]_D^{25} = +0.62°$(a) [29]

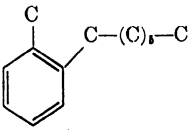
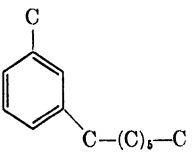
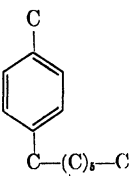
(a) This constant was determined on the *dextro*rotatory form.

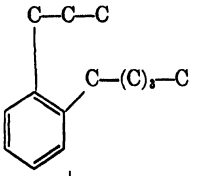
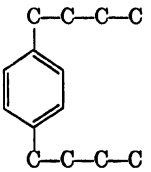
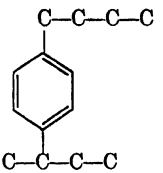
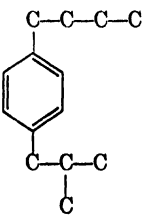
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4-Benzylheptane 	241–244 756 [36] 241–243 756 [3,35]	0.854 14° [3,35,36]	1.487 14° [36]	
2-Methyl-2-phenylheptane 	243 738 [20] 116–118 16 [20]	0.8756 [20]	1.4951 [20]	
3-Methyl-3-phenylheptane 	120–121 17 [18]	0.8738 [18]	1.4932 [18]	
4-Methyl-4-phenylheptane 	242–243 749 [18] 120–121 12 [15] 109–111 10 [18]	0.8700 [18] 0.8708 [15]	1.4930 [18] 1.49326 15° [15]	

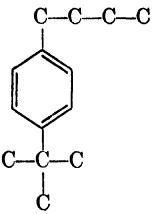
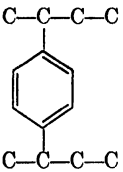
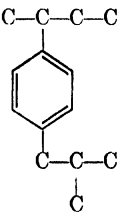
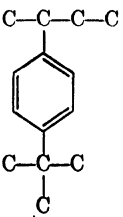
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Ethyl-3-phenylhexane	237–238 [15] 237–238 745 [18] 116–117 14 [18]	0.8788 [18] 0.8748 16° [15]	1.49383 [15] 1.4968 [18]	
3-Ethyl-4-phenylhexane	205 [2]			
2,3-Dimethyl-2-phenylhexane	236 748 [20] 105–107 14 [20]	0.8861 [20]	1.4961 [20]	
2,3-Dimethyl-3-phenylhexane	237–238 748 [18] 104.5 –106.5 11 [18]	0.8763 [18]	1.4958 [18]	

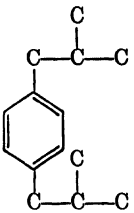
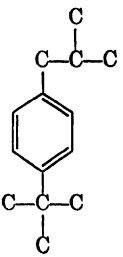
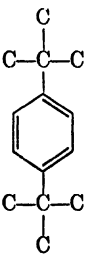
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,4-Dimethyl-2-phenylhexane 	238 748 [20] 112–115 17 [20]	0.8729 [20]	1.4920 [20]	
2,5-Dimethyl-2-phenylhexane 	236 748 [20] 113–116 19 [20] 116–117 14 [15]	0.8749 [20] 0.8844 18° [15]	1.4939 [20] 1.50233 15° [15]	
2,4-Dimethyl-4-phenylhexane 	114–116 10 [18]	0.8750 [18]	1.4918 [18]	
3,4-Dimethyl-3-phenylhexane 	112–114 10 [18]	0.8757 [18]	1.4929 [18]	
2-Methyl-2-phenyl-3-ethylpentane 	236 748 [20] 103–106 12 [20]	0.8782 [20]	1.4942 [20]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Methyl-3-ethyl-3-phenylpentane	238–239 745 [18] 113–114 14 [18]	0.8816 [18]	1.4981 [18]	
2,2,3-Trimethyl-3-phenylpentane	257–259 743 [18] 124–127 15 [18]			
2,3,3-Trimethyl-2-phenylpentane	235 748 [20] 110–113 17 [20]	0.8939 [20]	1.5031 [20]	
2,2,4-Trimethyl-4-phenylpentane	234.5 748 [20] 103–106 15 [20]	0.8803 [20]	1.4938 [20]	
2,3,4-Trimethyl-3-phenylpentane	234–236 743 [18]	0.8808 [18]	1.4970 [18]	

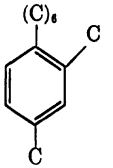
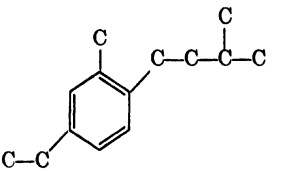
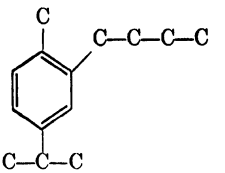
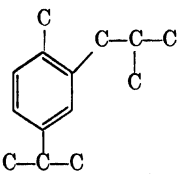
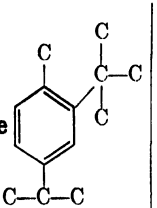
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-2-*n*-heptylbenzene 				
	263–263.2 [12]	0.8717 [12]	1.49124 $n_{H\alpha}^{20}$ [12] 1.50452 $n_{H\beta}^{20}$ [12] 1.51263 $n_{H\gamma}^{20}$ [12] 1.49521 n_{He}^{20} [12]	
1-Methyl-3-*n*-heptylbenzene 				
	260.0–260.8 [12]	0.8615 [12]	1.48722 $n_{H\alpha}^{20}$ [12] 1.50089 $n_{H\beta}^{20}$ [12] 1.50884 $n_{H\gamma}^{20}$ [12] 1.49140 n_{He}^{20} [12]	
1-Methyl-4-*n*-heptylbenzene 				
−28.5 [16]	265.0–265.2 [12] 127–127.5 10 [42]	0.8560 [12] 0.8586 [42]	1.4886 [42] 1.48598 $n_{H\alpha}^{20}$ [12] 1.49908 $n_{H\beta}^{20}$ [12] 1.50712 $n_{H\gamma}^{20}$ [12] 1.48968 n_{He}^{20} [12]	

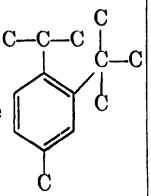
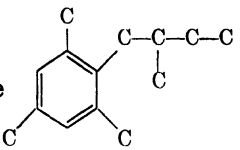
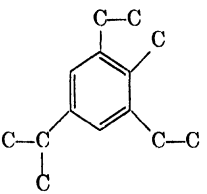
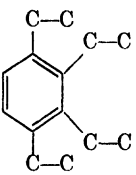
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Propyl-2-*n*-pentylbenzene 	128–130 16 [9]			
1,4-Di-*n*-butylbenzene 				
−24 [16]	259 745 [16] 124 15 [16]	0.8556 [16]	1.48792 [16]	
1-*n*-Butyl-4-*sec*-butylbenzene 				
	250 739 [16] 117 15 [16]	0.8570 [16]	1.48849 [16]	
1-*n*-Butyl-4-isobutylbenzene 				
	251 743 [16] 118 15 [16]	0.8508 [16]	1.48580 [16]	

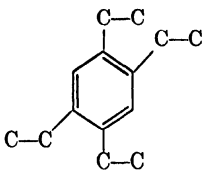
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-*n*-Butyl-4-*tert*-butylbenzene 				
-46^{16}	248 743 [16] 116 15 [16]	0.8595 [16]	1.48984 [16]	
1,4-Di-*sec*-butylbenzene 				
-58^{16}	237 [33] 233–237 [21] 236–238 744 [52] 239 739 [16] 108 15 [16]	0.8573 [16] 0.862 [52] 0.8548 25° [33]	1.48782 [16] 1.4884 [21] 1.489 [52] 1.4880 25° [33]	
1-*sec*-Butyl-4-isobutylbenzene 				
	241 739 [16] 113 15 [16]	0.8511 [16]	1.48560 [16]	
1-*sec*-Butyl-4-*tert*-butylbenzene 				
	235 745 [16] 108 15 [16]	0.8607 [16]	1.48916 [16]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Diisobutylbenzene 				
−21[16]	242 739[16] 109 15[16]	0.8456[16]	1.48338[16]	
1-Isobutyl-4-*tert*-butylbenzene 				
	239 751[16] 109 15[16]	0.8547[16]	1.48753[16]	
1,4-Di-*tert*-butylbenzene 				
77.8	**237.0**			
78–78.5[21,27,45] 78[22] 77–78[19,43,44] 77.7[16] 77[4,33,52] 76.5–77[17] 76(a) 75[39]	238[47] 236.5[7] 234–236[32] 234–236 746[32] 237 743[16] 109 15[16]	0.8659[19]	1.4624 90°[27]	

(a) The melting point 76 is found in references 7, 8, 14, 32, 34, 47.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Hexyl-2,4-dimethylbenzene 	131–133 13 [13]	0.886 D_0^{20} [13]	1.4972 [13]	
1-Methyl-2-(3′-methylbutyl)-5-ethylbenzene 	245–246 [31]	0.8801 11° [31]		
1-Methyl-2-*n*-butyl-4-isopropylbenzene 	235 [10]	0.892 17° [10]		
1-Methyl-2-isobutyl-4-isopropylbenzene 	230 [10]	0.916 17° [10]		
1-Methyl-2-*tert*-butyl-4-isopropylbenzene 	237 729 [6]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Isopropyl-2-*tert*-butyl-4-methylbenzene 				
	227 737 [5] 226 729 [6]			
1,3,5-Trimethyl-2-(2′-methylbutyl)-benzene 				
	241–243 747 [26] 133–135 19 [26]	0.8751 23.3° [26]	1.4976 23° [26]	
1,3-Diethyl-2-methyl-5-isopropylbenzene 				
	243–245 [53]	0.8846(a) [53]	1.5000(a) [53]	
(a) The temperature of the density and index of refractive was not given.				
1,2,3,4-Tetraethylbenzene 				*
		0.8881$_5$		
11.6 [51]	254 [23] 252–254 [37] 121.7 14 [51]	0.88780 [37] 0.88556 25° [37] 0.88664 19.6° [37]	1.50845 19.6° [37] 1.50444 $n_{Hα}^{19.6}$ [37]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,3,4-Tetraethylbenzene (*Continued*)		0.89092 15° [37] 0.89405 10° [37] 0.89822 4° [37]	1.51890 $n_{H\beta}^{19.6}$ [37] 1.52798 $n_{H\gamma}^{19.6}$ [37]	
	119–120 11 [46]			
* $\frac{dD}{dt} = -0.00060842$/°C (4 to 25°C)				
1,2,4,5-Tetraethylbenzene 				
13 [24]	250 [24] 248 755 [25]	0.884 16° [25]	1 5041 16° [25]	

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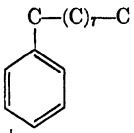
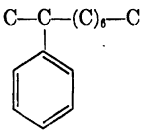
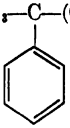
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}		n_D^{20}		Additional Data
n-Nonylbenzene 						*
		0.8584		**1.4863**		
	280–281 [26,45,63]	0.8050	94.8° [26]	1.4863 [26]		
	145–147 19 [71]	0.8226	69.7° [26]	1.4781	40° [26]	
	146 14 [81]	0.8371	49.8° [26]	1.4822	30° [26]	†
	137.5	0.8513	29.7° [26]	1.485	$n_{H\alpha}^{20}$ [45]	
	–138.5 9 [26,63]	0.8626	15.56° [63]			
	98–100 1 [79]	0.8659	9.2° [26]			

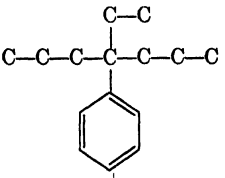
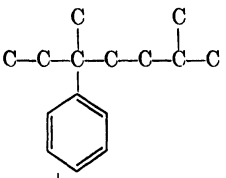
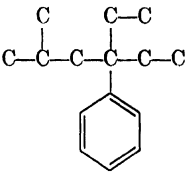
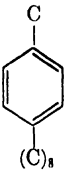
* $\frac{dD}{dt} = -0.00071645/°C$ (9 to 95°C)

† $\frac{dn}{dt} = -0.0004100/°C$ (20 to 40°C)

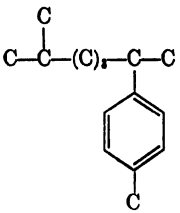
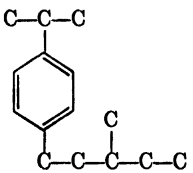
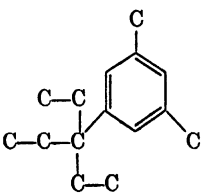
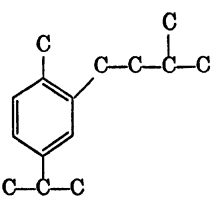
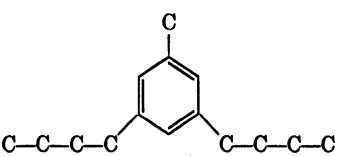
2-Phenylnonane 						*
		0.8627				
	145–147 19 [69,70]	0.862 [70]		1.4869	21.5° [69,70]	
		0.860	22° [69]			
		0.8616	22° [71]			
		0.877	0° [69]			
		0.8774	0° [71]			

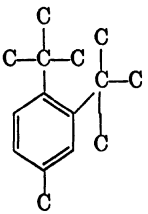
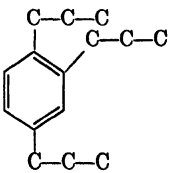
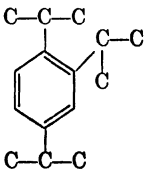
* $\frac{dD}{dt} = -0.00073333/°C$ (0 to 22°C)

5-Phenylnonane 						
	126–127 12 [50]	0.8477	D_{50}^{50} [50]	1.4874	18.5° [50]	
		0.8596	D_{20}^{20} [50]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4-Ethyl-4-phenylheptane 	127–128 15 [19]	0.8698 [19]	1.49211 15° [19]	
3,6-Dimethyl-3-phenylheptane 	122–123 14 [19]	0.8788 16° [19]	1.49894 13° [19]	
2-Methyl-4-ethyl-4-phenylhexane 	240–242 [19]	0.8725 16° [19]	1.49097 [19]	
1-Methyl-4-Octylbenzene 	281–283 [40] 269–271 [25] 141–141.5 11 [61]	0.8574 [61] 0.8966(a) D_{20}^{20} [25] 0.9057 D_0^0 [25]	1.4872 [61] 1.49982(b) [25]	

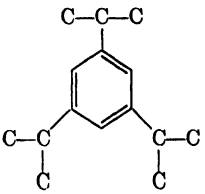
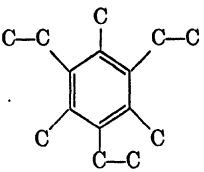
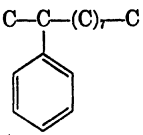
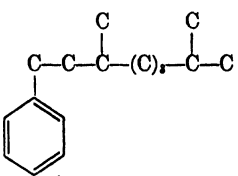
(a) This density is the average of two determinations.
(b) The temperature for this refractive index is not given.

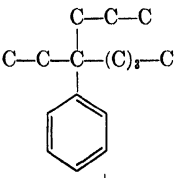
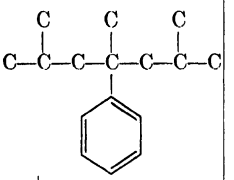
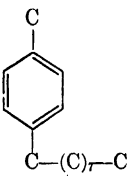
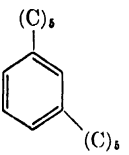
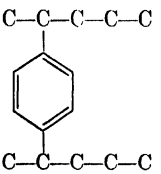
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Methyl-6-*p*-tolylheptane 	135–136 15 [54]	0.8524 15° [54]	1.4832 16° [54]	
1-Isopropyl-4-(3′-methylpentyl)-benzene 	265 748 [31] 131–132 10.2 [31]	0.8632 15.5° [31]	1.4921 15° [31]	$[\alpha]_D^{15.5}$ = +15.91° [31]
1,3-Dimethyl-5-[3′-(3′-ethylpentyl)]-benzene 	257–259 745 [4]			
1-Methyl-2-(3′-methylbutyl)-4-isopropylbenzene 	111–115 12 [53]			
1-Methyl-3,5-di-*n*-butylbenzene 	240–245 [47]			

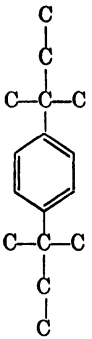
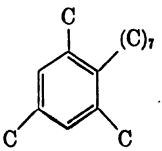
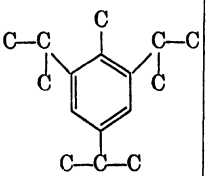
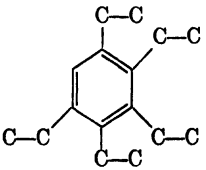
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Di-*tert*-butyl-4-methylbenzene 				
31.5–32 [8]	227.5 –228 735 [8] 117–118 15.5 [8] 111–112 12 [8]			
1,2,4-Tri-*n*-propylbenzene 				
	135 20 [3]			
1,2,4-Triisopropylbenzene 				
		0.8620	**1.4924**	
	244 [30]	0.862 [21]	1.4926 [46]	
	240–242 753 [21]	0.8634 [46]	1.4929 [21]	
	237–	0.8556 30° [46]	1.4883 30° [46]	
	237.5 752 [5]	0.8593 D_{25}^{25} [5]	1.4896 25° [64]	
	237.0 736 [64]	0.8599 D_{25}^{25} [64]	1.494 16° [30]	
	113–114 14 [30]	0.863 16° [30]		
	97–97.5 4 [5]	0.8674 D_0^0 [5]		

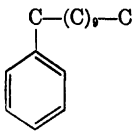
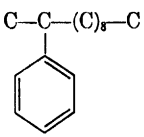
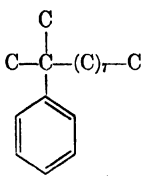
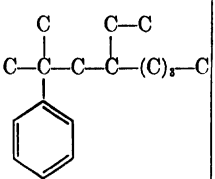
* $\frac{dD}{dt} = -0.00077953/°C$ (0 to 30°C)

† $\frac{dn}{dt} = -0.00044235/°C$ (16 to 30°C)

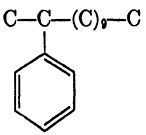
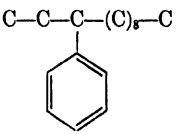
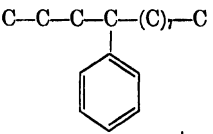
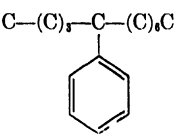
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3,5-Triisopropylbenzene 				
118.1–118.8 [46]	236–236.5 [18] 233.5–234.5 [5]	0.8447 [46] 0.8466 30° [46]	1.4882 [46] 1.4836 30° [46]	
1,3,5-Trimethyl-2,4,6-triethylbenzene 				
	238–247 [52]			
$C_{16}H_{26}$				
2-Phenyldecane 				
		0.8629		
	131–132 3 [69,70,71]	0.861 [70] 0.8623 22° [71] 0.862 19° [69] 0.877 0° [69] 0.8776 0° [71]	1.4856 22.0° [69,70,71]	
* $\frac{dD}{dt} = -0.0007242$/°C (0 to 22°C)				
1-Phenyl-3,7-dimethyloctane 				$[\alpha]_D^{11.5} = -1.82°$ [32]
	275 [32] 140 8.5 [32]	0.8789 10.5° [32]	1.4960 10.5° [32]	

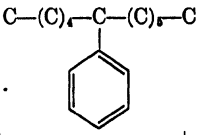
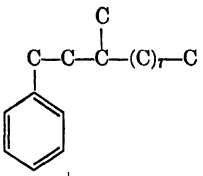
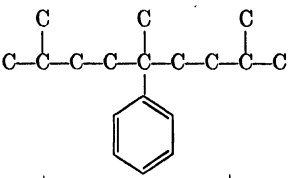
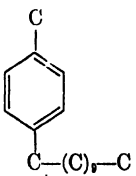
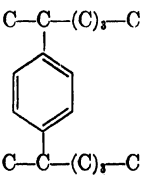
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Propyl-3-phenylheptane 				
	140–141 15 [19]	0.8694 [19]	1.4924 15° [19]	
2,4,6-Trimethyl-4-phenylheptane 				
	143–144 18 [19]	0.8753 [19]	1.49497 15° [19]	
1-Methyl-4-*n*-nonylbenzene 				
	160–161 12 [20]			
1,3-Dipentylbenzene 				
	265 [2]	0.8868 0° [2]		
1,4-Di-*sec*-pentylbenzene 				
	265 [48] 141–146 20 [72]	0.863 [72] 0.8496 25° [48]	1.495 [72] 1.4845 25° [48]	

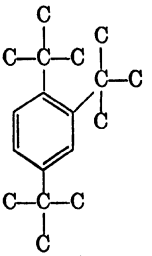
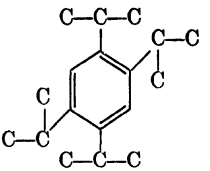
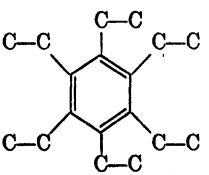
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Di-*tert*-pentylbenzene 	260 [48]	0.8491 25° [48]	1.4841 [48]	
1,3,5-Trimethyl-2-heptylbenzene (a) 	271–272 750 [32A] 157–158 15 [32A]	0.8753 17° [32A]	1.4970 17° [32A]	
(a) The structure of the heptyl group is not given.				
1-Methyl-2,4,6-triisopropylbenzene 	252–253 757 [10]	0.8695 [10]	1.4995 [10]	
Pentaethylbenzene 	277 [23,37]	0.8336 107.9° [14] 0.8963 20.3° [14] 0.8985 D_{19}^{19} [23]	1.48803 $n_{H\alpha}^{107.9}$ [14] 1.52700 $n_{H\alpha}^{20.3}$ [14] 1.47476 $n_{H\beta}^{107.9}$ [14] 1.51270 $n_{H\beta}^{20.3}$ [14]	

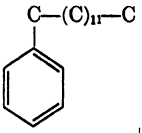
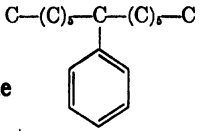
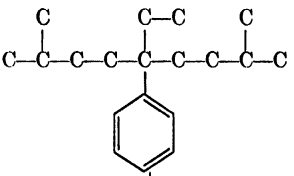
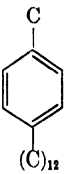
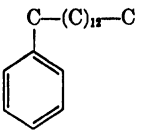
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Dimethyltetraethylbenzene (a)				
	123-126 0.15 [66A]	0.8771 [66A] 0.8762 19° [66A] 0.8804 15° [66A]	1.4958 [66A] 1.4971 19° [66A] 1.4994 15° [66A]	
(a) The structure of this compound is not given.				
$C_{17}H_{28}$ **n-Undecylbenzene** 	296 ± 1 [45]		1.4824 $n_{H\alpha}^{20}$ [45]	
2-Phenylundecane 	142-146 6 [69,70,71]	0.8599 0.860 [70] 0.857 23.5° [69] 0.8572 23.5° [71] 0.875 0° [69] 0.8755 0° [71]	1.4829 18.7° [69,70,71]	
* $\frac{dD}{dt} = -0.00077587/°C$ (0 to 24°C)				
2-Methyl-2-phenyldecane 	160 20 [83]	0.8676 [83]	1.48594 [83]	
2-Methyl-2-phenyl-4-ethyloctane 	149 20 [83]	0.8620 [83]	1.487749 [83]	

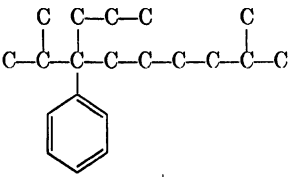
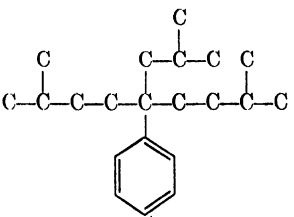
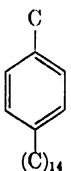
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Methyl-4-propyl-4-phenylheptane				
	143–144 11 [19]	0.8750 16° [19]	1.496 13° [19]	
1-Methyl-4-decylbenzene				
−11.5 [61]	169–169.5 11 [61]	0.8549 [61]	1.4854 [61]	
Methylpentaethylbenzene				
43 [12]	294 [12]			
$C_{18}H_{30}$				
***n*-Dodecylbenzene**				
		0.8568	**1.4844**	
—3 [26]	179–180 13 [51]	0.8564 [58,60]	1.4822 [58,60]	
−7 [51]	183–185 12 [60]	0.8013 100.0° [26]	1.4847 [26]	
	172–173 9 [26,27]	0.8084 89.8° [26]	1.4786 35° [26]	
		0.8225 69.0° [26]	1.4806 30° [26]	
		0.8295 59.0° [26]	1.4826 25° [26]	
		0.8356 49.8° [26]	1.47431 17° [51]	
		0.8419 40.6° [26]	1.4877 13° [26]	
		0.8502 30° [60]		
		0.8496 29.9° [26]		

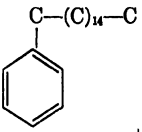
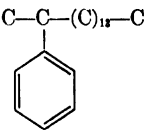
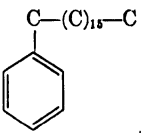
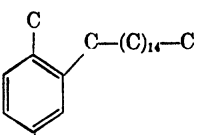
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
n-Dodecylbenzene (*Continued*)		0.8562 21.1° [26] 0.8598 D_{21}^{21} [51] 0.8607 15.5° [27] 0.8636 10.5° [26]		
* $\frac{dD}{dt} = -0.0006966/°C$ (10 to 100°C) † $\frac{dn}{dt} = -0.0003959/°C$ (13 to 35°C)				
2-Phenyldodecane 	182–184 20 [72] 143 1.8 [59]	0.855 [72] 0.8402 40° [59] 0.8488 30° [59]	1.4818 [72] 1.4849 [59]	
3-Phenyldodecane 	127 0.8 [59]	0.8376 40° [59] 0.8466 30° [59]	1.4829 [59]	
4-Phenyldodecane 	140–142 0.6 [59]	0.8407 40° [59] 0.8489 30° [59]	1.4850 [59]	
5-Phenyldodecane 	113 0.4 [59]	0.8406 40° [59] 0.8485 30° [59]	1.4850 [59]	

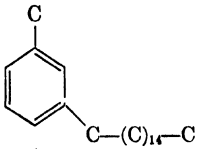
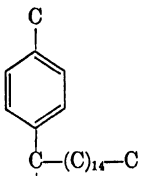
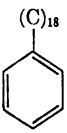
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
6-Phenyldodecane 	108 0.4 [59]	0.8392 40° [59] 0.8477 30° [59]	1.4852 [59]	
1-Phenyl-3-methylundecane 	143–145 2 [39]	0.8590 23.5° [39]	1.4852 24.5° [39]	$[\alpha]_D^{23.5} = -1.31°$ [39]
2,5,8-Trimethyl-5-phenylnonane 	153–155 15 [19]	0.8728 [19]	1.49326 15° [19]	
1-Methyl-4-*n*-undecylbenzene 	171–172 12 [20]			
1,4-Di-*sec*-hexylbenzene 	104–106 0.3 [66]	0.914 [66]	1.5020 [66]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,4-Tri-*tert*-butybenzene 				
128 [33,62,65]	291–292 736.6 [62]			
1,2,4,5-Tetraisopropylbenzene 				
118.4				
119–119.4 [21]	260 775 [5]	0.758 150° [33]		
119 [64]	169 70 [30]	0.770 135° [33]		
118.5 [33]	133 17 [30]			
118 [15,30]				
117–118 [6,78]				
117 [5]				
Hexaethylbenzene 				
128.3	**297.2**			
130 [12,67]	298–299 [24]	0.8550 [36]	1.47357 $n_{H\alpha}^{130.4}$ [14]	
129 [23,33,49,78]	298–298.5 [73]	0.814 150° [33]	1.48686 $n_{H\beta}^{130.4}$ [14]	
128–129 [41]	298 [33,87]	0.824 135° [33]		
127 [22,38,77]	296.5 [12]	0.8305 130.4° [14]		
126–127 [76]	294 [5]	0.997 0° [82]		
126.5 [42]				
126 [11,16,24,78]				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
n-Tridecylbenzene 	188–189.5 10 [81]			
7-Phenyltridecane 	183–184 20 [50]	0.8604 D_{50}^{50} [50] 0.8723 D_{20}^{20} [50]	1.49307 18° [50]	
2,8-Dimethyl-5-ethyl-5-phenylnonane 	170–172 14 [19]	0.8955 18.5° [19]	1.50735 15° [19]	
1-Methyl-4-dodecylbenzene 	155.5 1.5 [61]	0.8560 [61]	1.4845 [61]	
$C_{20}H_{34}$				
n-Tetradecylbenzene 		**0.8565**	**1.4812**	
8.6 [26]	195–196 9 [26,27]	0.8559 [58,60]	1.4813 [58,60]	
	153 0.5 [60]	0.8567 [26]	1.4844 [26]	
		0.8012 101.9° [26]	1.4724 50° [26]	
		0.8078 91.9° [26]	1.4763 40° [26]	
		0.8142 82.4° [26]	1.4805 30° [26]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}		n_D^{20}		Additional Data
n-Tetradecylbenzene (*Continued*)		0.8223	70.0° [26]	1.4824	25° [26]	
		0.8300	59.7° [26]	1.4875	12.3° [26]	
		0.8359	49.9° [26]			
		0.8427	39.5° [26]			
		0.8496	30° [60]			
		0.8500	29.5° [26]			
		0.8605	15.5° [27]			
		0.8629	10.7° [26]			
* $\frac{dD}{dt} = -0.0006791$/°C	(10 to 102°C)					
† $\frac{dn}{dt} = -0.0003940$/°C	(12 to 50°C)					
2,8-Dimethyl-3-propyl-3-phenylnonane 						
	180–181 15 [19]	0.8677 [19]		1.48751	15° [19]	
Diheptylbenzene (a)						
	163–165 9 [70]	0.853	21.5° [70]	1.4819	25° [70]	
(a) The structure of this compound is not given.						
$C_{21}H_{36}$						
2,8-Dimethyl-5-isobutyl-5-phenylnonane 						
	172–173 11 [19]	0.89817 [19]		1.50623	15° [19]	
1-Methyl-4-tetradecylbenzene 						
16.8 [61]	170 0.8 [61]	0.8560 [61]		1.4839 [61]		

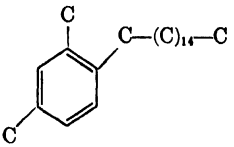
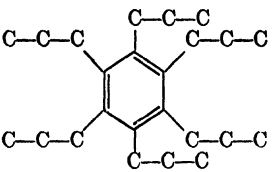
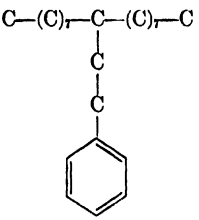
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
n-Hexadecylbenzene (n-Cetylbenzene) 				
27 [34,35]	235–237 16 [13]	0.8558 [58,60]	1.4814 [58,60]	
22 15mm [1]	230 15 [34,35]	0.877 [70]	1.452 92° [74]	
	171 0.1 [60]	0.8079 99.2° [35]	1.47986 21.8° [13]	
	136–137 0 [36]	0.8493 30° [60]	1.47677 $n_{H\alpha}^{21.8}$ [13]	
		0.8567 27° [35]	1.48750 $n_{H\beta}^{21.8}$ [13]	
			1.49409 $n_{H\gamma}^{21.8}$ [13]	
2-Phenylhexadecane 				
	191–194 9 [69,70,71]	0.864 [69,70]	1.4839 18.8° [69,70,71]	
		0.8640 20.5° [71]		
		0.8805 0° [71]		
Dioctylbenzene (a)				
	338–343 [21]			
(a) The structure of this compound is not given.				
$C_{23}H_{40}$				
n-Heptadecylbenzene 				
38 [81]				
1-Methyl-2-n-hexadecylbenzene 				
8–9 [35]	238.5–239 15 [35]	0.8072 99° [35]		
		0.8676 9.2° [35]		

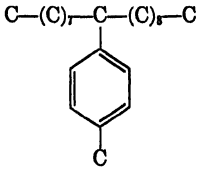
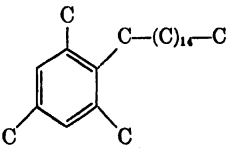
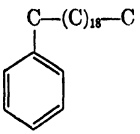
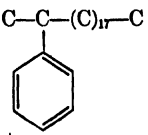
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-3-*n*-hexadecylbenzene 				
11–12 [35]	236.5–237 15 [35]	0.8029 99.3° [35] 0.8617 11° [35]		
1-Methyl-4-*n*-hexadecylbenzene 				
27.5 [35]	239.5–240 15 [35]	0.8027 99° [35] 0.8499 27.5° [35]		
$C_{24}H_{42}$				
Octadecylbenzene (a) 				
34.3		**0.8568**	**1.4812**	
36.5 [38]	249 15 [34]	0.8563 [68]	1.4826 [68]	
35–36 [43,44]	183 3 [68]	0.8566 [68]	1.4828 [68]	
32.8 [75]	180–181 3 [68]	0.8224 71.5° [75]	1.4600 73.5 [75°]	
32 [34]	147 0 [36]	0.8437 41° [75]	1.4640 63° [75]	
30 [68]		0.8439 40° [38]	1.4730 40° [75]	
25–26 [68]			1.4745 36° [75]	
29 15mm [1]			1.4768 30° [75]	
			1.4778 27° [75]	
			1.4812 25° [43]	

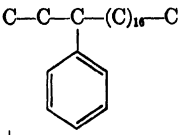
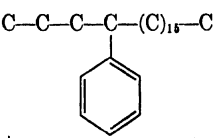
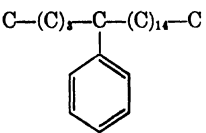
* $\frac{dD}{dt} = -0.0006611/°C$ (20 to 72°C)

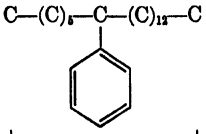
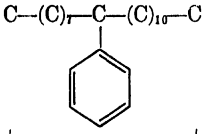
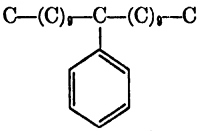
† $\frac{dn}{dt} = -0.0004012/°C$ (20 to 74°C)

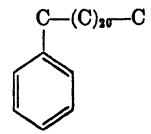
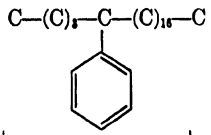
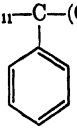
(a) The data tabulated may be for different isomers. The structure of the octadecyl group was given only for the compound referred to in reference 38. This structure is *n*-octadecylbenzene.

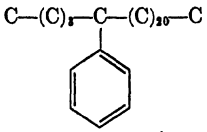
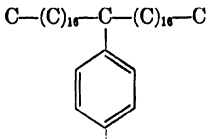
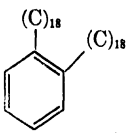
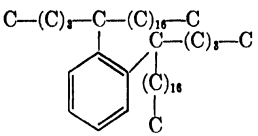
M. P., °C	B. P., °C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1,5-Dimethyl-2-*n*-hexadecylbenzene 							
33.5 [35]	249.5–250	15 [35]	0.8062	99.4° [35]			
	149	0 [36]	0.8495	33.5° [35]			
Hexa-*n*-propylbenzene 							
			0.8185	**100°**			
103.0 [17]	332.2 [17]		0.7312	220° [17]			
101 [78]	278.0	200 [17]	0.7457	200° [17]			
	253.5	100 [17]	0.7821	150° [17]			
	231.1	50 [17]	0.8112	110° [17]			
	204.3	20 [17]	0.8163	103° [17]			
	185.8	10 [17]					
* $\frac{dD}{dt} = -0.0007275$/°C (100 to 220°C)							
$C_{25}H_{44}$							
9-Phenethylheptadecane 							
			0.8560		**1.4806**		
−26.7 [55,56]	189.0	1.00 [55]	0.8558 [55,56]		1.4806 [55,56]		
	189	1.00 [56]	0.8038	98.9° [56]	1.4729	40.0° [56]	
	176	0.50 [56]	0.8298	60° [56]	1.4767	30.0° [56]	
			0.8439	37.8° [56]			
			0.8697	0° [56]			
* $\frac{dD}{dt} = -0.0006712[1+0.0003912(t-20)]$/°C (0 to 99°C)							
† $\frac{dn}{dt} = -0.0003850$/°C (20 to 40°C)							

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
9-*p*-Tolyloctadecane 			**0.8549**		**1.4811**		
	185	1.0 [7]	0.8549 [7,55]		1.4811 [7,55]		
	173	0.5 [7]	0.8024	98.9° [7]	1.4734	40.0° [7]	
			0.8283	60° [7]	1.4771	30.0° [7]	
			0.8433	37.8° [7]			
			0.8681	0° [56]			
* $\frac{dD}{dt}$ = −0.0006648/°C (0 to 99°C)							
† $\frac{dn}{dt}$ = −0.0003850/°C (20 to 40°C)							
1,3,5-Trimethyl-2-*n*-hexadecylbenzene 							
40 [35]	258–258.5	15 [35]	0.8065	99.2° [35]			
	154–155	0 [36]	0.8452	40° [35]			
$C_{26}H_{46}$ **1-Phenyleicosane** 							
42.3 [55]	212.0	1.00 [55]	0.8039	98.9° [55]	1.4725	40.0° [55]	
	197.5	0.50 [55]	0.8235	60° [55]			
2-Phenyleicosane 			**0.8547**		**1.4795**		
29.0 [55]	204.5	1.00 [55]	0.8027	98.9° [55]	1.4795 [55]		
	190.0	0.50 [55]	0.8283	60° [55]	1.4721	40.0° [55]	
			0.8430	37.8° [55]	1.4758	30.0° [55]	
* $\frac{dD}{dt}$ = −0.0006594/°C (20 to 99°C)							
† $\frac{dn}{dt}$ = −0.000370/°C (20 to 40°C)							

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
3-Phenyleicosane 							
			0.8546		**1.4796**		
29.3 [55,56]	202	1.00 [56]	0.8032	98.9° [56]	1.4796 [55,56]		
	188	0.50 [56]	0.8282	60° [56]	1.4720	40.0° [56]	
			0.8432	37.8° [56]	1.4758	30.0° [56]	
* $\frac{dD}{dt} = -0.0006533$/°C (20 to 99°C)							
† $\frac{dn}{dt} = -0.000380$/°C (20 to 40°C)							
4-Phenyleicosane 							
			0.8546		**1.4794**		
31.4 [55]	199.0	1.00 [55]	0.8028	98.9° [55]	1.4794 [55]		
	184.5	0.50 [55]	0.8281	60° [55]	1.4718	40.0° [55]	
			0.8430	37.8° [55]	1.4756	30 0° [55]	
* $\frac{dD}{dt} = -0.0006571$/°C (20 to 99°C)							
† $\frac{dn}{dt} = -0.000380$/°C (20 to 40°C)							
5-Phenyleicosane 							
			0.8549		**1.4796**		
30.2 [55,56]	197	1.00 [56]	0.8015	98.9° [56]	1.4796 [55,56]		
	184	0.50 [56]	0.8275	60° [56]	1.4720	40.0° [56]	
			0.8430	37.8° [56]	1.4757	30.0° [56]	
* $\frac{dD}{dt} = -0.0006780$/°C (20 to 99°C)							
† $\frac{dn}{dt} = -0.000380$/°C (20 to 40°C)							

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
7-Phenyleicosane 							
			0.8535		**1.4794**		
16.4 [55,56]	196	1.00 [56]	0.8535 [55,56]		1.4794 [55,56]		
	183	0.50 [56]	0.8014	98.9° [56]	1.4717	40.0° [56]	
			0.8272	60° [56]	1.4756	30.0° [56]	
			0.8417	37.8° [56]			
* $\frac{dD}{dt} = -0.0006599$/°C (20 to 99°C)							
† $\frac{dn}{dt} = -0.000385$/°C (20 to 40°C)							
9-Phenyleicosane 							
			0.8534		**1.4790**		
17.9 [55,56]	196	1.00 [56]	0.8530 [55,56]		1.4790 [55,56]		
	183	0.50 [56]	0.8011	98.9° [56]	1.4713	40.0° [56]	
			0.8268	60° [56]	1.4751	30.0° [56]	
			0.8422	37.8° [56]			
* $\frac{dD}{dt} = -0.0006619$/°C (20 to 99°C)							
† $\frac{dn}{dt} = -0.000385$/°C (20 to 40°C)							
$C_{27}H_{48}$ **11-Phenylheneicosane** 							
			0.8531		**1.4788**		
20.8 [7,55,80]	205	1.0 [7]	0.8531 [7,55,80]		1.4788 [7,55,80]		
	204	1.0 [80]	0.8018	98.9° [7]	1.4713	40.0° [7]	
	191	0.5 [7]	0.8270	60° [7]	1.4751	30.0° [7]	
			0.8415	37.8° [7]			
* $\frac{dD}{dt} = -0.0006502$/°C (20 to 99°C)							
† $\frac{dn}{dt} = -0.000375$/°C (20 to 40°C)							

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Bombicestane (a)				
79 [28]				
(a) No clue to the structure of this compound is given.				
$C_{28}H_{50}$				
***n*-Docosylbenzene** 				
42–44 [43]			1.4806 25° [43]	
5-Phenyldocosane 				
38 [43,44]	200–201 1 [44]	0.8554 25° [43]	1.4777 25° [43]	
$C_{29}H_{52}$				
Ingostane (a)				
75 [29]				
(a) No clue to the structure of this compound is given.				
$C_{31}H_{56}$				
13-Phenylpentacosane 				
		0.8537	**1.4787**	
31.7 [55,56]	235 1.00 [56]	0.8030 98.9° [56]	1.4787 [55,56]	
	220 0.50 [56]	0.8278 60° [56]	1.4713 40.0° [56]	
		0.8424 37.8° [56]	1.4750 30.0° [56]	
* $\frac{dD}{dt} = -0.0006440$/°C (20 to 99°C)				
† $\frac{dn}{dt} = -0.000370$/°C (20 to 40°C)				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
5-Phenylhexacosane 				
32–33 [43]		0.8532 25° [43]	1.4787 25° [43]	
$C_{41}H_{76}$ **18-Phenylpentatriacontane** 				
61–62 [67]				
$C_{42}H_{78}$ **1,2-Dioctadecylbenzene** 				
69–70 [43]				
$C_{50}H_{94}$ **1,2-Di-(5′-docosyl)-benzene** 				
64–66 [43]		0.847 [43]		
$C_{60}H_{114}$ **Trioctadecylbenzene** (a)				
46.5–47 [43]		0.8520 25° [43]	1.4813 25° [43]	

(a) The structure of this compound is not given.

$C_{15}H_{24}$-$C_{60}H_{114}$ References

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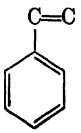
3. BENZENE WITH ONE ALKENYL SUBSTITUTION, C_nH_{2n-8}

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Styrene (Ethenylbenzene) (Cinnamene) (Vinylbenzene)				*
−30.6	**145.3**	**0.90675**	**1.5465**	
−30.5 [15]	146.2 [64]	0.9031 [37]	1.5450 [17]	
−30.60(a) [49,66]	146 [8,9,25,27,54,60]	0.9056 [66]	1.5450(c) [11]	
−31.9 [20]	145.5–146 [6,30]	0.9065 [17]	1.5463 ± 0.0002 [35]	
−32 [54]	145–146 [34,43]	0.9074 [12,14]	1.54633 [50]	
−33 [50,63]	144–146 [7,32]	0.9090 [50,63]	1.5469 [49]	†
−33.3 [48]	145.99 [20]	0.7909 145° [66]	1.5470 [15]	
	145–145.8 [63]	0 7926 143° [45]	1.5446 24° [47]	
	145.5 [39]	0.8138 120° [66]	1.5440 23° [44]	
	144–145.5 [14]	0.8322 100° [66]	1.5446 21.0° [22,42]	
	145.0–145.4 [16]	0.8506 80° [66]	1.54633 20.05° [63]	
	145.2 [66]	0.8689 60° [66]	1.54486 19.9° [56]	
	145(b)	0.8873 40° [66]	1.5472 19° [26]	
	144–145 [24,28,38,59,65]	0.8938 37.8° [20]	1.54849 16.6° [56]	
	144.5 [51]	0.8998 25° [25]	1.5488 13° [29]	
	144–144.5 [13,19]	0.9010 25° [66]	1.50433 $n_{H\alpha}^{75}$ [40]	
	144 [17,52]	0.9038 23° [44]	1.53022 $n_{H\alpha}^{25}$ [40]	
	143.8 [62]	0.9080 21.1° [20]	1.53983 $n_{H\alpha}^{20.05}$ [63]	‡
	145–146 761 [56]	0.9083 D_{20}^{20} [26]	1.53666 $n_{H\alpha}^{20}$ [51]	
	146 759 [29]	0.9073 19.9° [56]	1.54030 $n_{H\alpha}^{20}$ [12]	
	143.9–144.4 753 [26]	0.9074 18.5° [18]	1.53782 $n_{H\alpha}^{19.9}$ [56]	
	143.5–145.5 745 [33]	0.90595 17° [39]	1.53699 $n_{H\alpha}^{17}$ [39]	
	76.2–76.7 80 [41]	0.9072 17° [61]	1.54191 $n_{H\alpha}^{16.6}$ [56]	
	73–74 73 [7]	0.9103 16.6° [56]	1.53853 $n_{H\alpha}^{13.15}$ [55]	
	68 61 [53]	0.9085 16° [7]	1.52180 $n_{H\beta}^{75}$ [40]	
	69.5–70.0 60 [48]	0.9127 15.6° [20]	1.54677 $n_{H\beta}^{25}$ [40]	
	65.6 50 [15]	0.9074 15° [13]	1.5615 $n_{H\beta}^{21.0}$ [22]	
	65.15 50 [15]	0.911 15° [6]	1.56377 $n_{H\beta}^{20.05}$ [63]	§
	60.0 45.002 [20]	0.9121 13° [29]	1.56312 $n_{H\beta}^{20}$ [12]	
	57–58 32 [21]	0.9240 0° [66]	1.55569 $n_{H\beta}^{19.9}$ [56]	
	52.4 31 [1]	0.9251 0° [64]	1.56036 $n_{H\beta}^{17}$ [39]	
	54 30 [17]	0.9259 0° [20]	1.56593 $n_{H\beta}^{16.6}$ [56]	
	53–54 29 [23]	0.9297 −4.4° [20]	1.56184 $n_{H\beta}^{13.15}$ [55]	
	52–53 28 [44]	0.9410 −17.8° [20]	1.57888 $n_{H\gamma}^{20}$ [12]	
	48.4 22 [58]		1.57249 $n_{H\gamma}^{19.9}$ [56]	
	43 17 [6]		1.57588 $n_{H\gamma}^{17}$ [39]	
	40 14 [56,57]		1.58163 $n_{H\gamma}^{16.6}$ [56]	
	40 13 [36]			
	37.8 12.117 [20]			
	36 12 [43]			

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}	n_D^{20}	Additional Data
Styrene (*Continued*)	34.2	10 [57]		1.57729 $n_{H\gamma}^{13.15}$ [55] (d)	
	33	10 [29]			
	21.1	4.589 [20]			
	8.2	2.16 [31]			
	0	1.189 [20]			
	−0.5	1.13 [31]			
	−7.7	0.65 [31]			

* $\frac{1}{T_b} = 0.0036886 - 0.0004284 \log_{10} p_{mm}$ (0.65 to 80 mm)

† $\frac{dD}{dt} = -0.0008954[1 + 0.0006252(t - 20)]/°C$ (−18 to 145°C)

‡ $\frac{dD}{dt} = -0.0008739/°C$ (0 to 40°C)

§ $\frac{dn}{dt} = -0.0005186/°C$ (13 to 25°C)

(a) This figure is given as a freezing point in the literature.
(b) The boiling point 145 is found in references 2, 3, 4, 5, 46, 50.
(c) This refractive index is the average of two or more determinations.
(d) Refractive indices at other lines may be found in references 10, 22.

Styrene References

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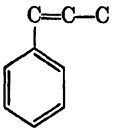
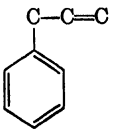
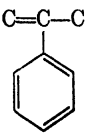
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Propen-1-ylbenzene 				*
	173.5	**0.9105**		
20 [36]	176–177 [39,52,78]	0.9070 [49]	1.5420 [10]	
	176 [22,53]	0.9088 [10]	1.5432 [33]	
	174–176 [61]	0.913 [37]	1.549 [72]	
	174–175.25 [32]	0.9130 [35]	1.5492 [30]	
	175 [5,67]	0.914 [72]	1.5493 [64]	
	174–175 [68]	0.9141 [8,30]	1.5494 [8]	
	172–175 [1]	0.9078 26° [30]	1.550 [37]	
	174 [9,50]	0.9083 26° [30]	1.54967 18.7° [74]	
	172–174 [35]	0.9076 D_{25}^{25} [52]	1.55069 17° [49]	
	173 [37]		1.5482 14° [29]	
	171–172 [43]	0.90902 D_0^{23} [1]	1.5497 12° [30]	
	170–171 [2,56]	0.9109 D_{20}^{20} [52]	1.558 7° [54]	
	169–171 [77]	0.9083 19° [26]	1.54257 $n_{H\alpha}^{18.7}$ [74]	
	167–170 [14,33,34]	0.9145 18.7° [74]	1.56600 $n_{H\beta}^{18.7}$ [74]	
	167 [16]	0.9188 15° [3]	1.5803 $n_{H\gamma}^{18.7}$ [74]	
	177 756 [30]	0.9143 D_{15}^{15} [52]		
	172–173 754 [15]	0.9151 13° [30]		
	173–175 750 [3]	0.9181 12° [30]		
	166.7 746 [10]	0.9181 D_{10}^{10} [52]		
	73 20 [49]	0.918 7° [54]		
	72–74 15 [29]	0.922 D_5^5 [52]		
	72–73 15 [48]	0.9230 D_4^4 [52]		
	68 15 [72]	0.9253 0° [30]		
	74 13 [26]			
	71 13 [63]			
	67.5 13 [75]			
	65.5 13 [74,75]			
	65 13 [64]			
	63.5 13 [37]			
	68 12 [54]			
	66–67 12 [40]			
	69–70 11 [35]			
	65–70 10 [34]			
	64–65 10 [17]			
	61 10 [49]			

* $\frac{dD}{dt} = -0.0007588/°C$ (0 to 26°C)

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Propen-2-ylbenzene (Allylbenzene) 				
	156.3			
−40 [36]	157–160 [1]	0.8929 [8]	1.5118 [64]	
	158–159 [3]	0.8930 [23]	1.5126 [23]	
	157–159 [24]	0.893 [36,37]	1.514 [37]	
	156–159 [46]	0.8812 25° [46]	1.5143 [8,68]	
	157 [7,37]	0.8929 D_0^{20} [5,1]	1.5042 25° [46]	
	156–157 [20,32,44,68]	0.9012 15° [68]	1.5126 21.7° [32]	
	156 [5,38,56]	0.9018 14.5° [3]	1.5137 21.5° [56]	
	155–156 [6]	0.90706 D_0^0 [1]	1.52002 14.5° [3]	
	155 [9,11,22,67]			
	155–157 750 [4]			
	154 730 [54]			
	153–154 725 [21]			
	52–55 16 [42]			
	50 16 [36]			
	47 13 [36,37]			
Isopropenylbenzene 				
	161.6	**0.9096**	**1.5363**	
	162–165 [63,74]	0.908 [71]	1.535 [71]	
	162–164 [70]	0.9115 [12]	1.5364 [74]	
	161–163 [28]	0.9044 24° [28]	1.5350 22° [59]	
	162 [27]	0.9070(a) D_{22}^{22} [59]	1.5370 22° [59]	
	161–162 [66]	0.9085 21° [66]	1.5371 22° [59]	
	160–162 [67]	0.9142 D_{20}^{20} [12]	1.53492 19.8° [74]	
	160–161 [2]	0.9078 19.8° [74]	1.5377 19° [40]	
	160 [25]	0.9125 19° [40]	1.5385 19° [59]	
	165 764 [45]	0.9134 17.4° [74]	1.53842 17.4° [74]	
	163 761 [59]	0.9165 9.6° [18,19]	1.54207 9.6° [18,19]	
	164–165 754 [40]	0.9231 0° [67]	1.52893 $n_{H\alpha}^{19.8}$ [74]	
	163–164 752 [73]	0.9278 0° [66]	1.53257 $n_{H\alpha}^{17.4}$ [74]	
	162 752 [59]	0.92725(a) D_0^0 [12]	1.54959 $n_{H\beta}^{19.8}$ [74]	
	164 749 [65]		1.55353 $n_{H\beta}^{17.4}$ [74]	
	158–160 748 [18,19]		1.56284 $n_{H\gamma}^{19.8}$ [74]	
	159–160 744 [59]		1.56637 $n_{H\gamma}^{17.4}$ [74]	
	160–162 743 [59]			
	106 126 [19]			

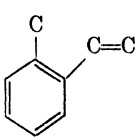
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Isopropenylbenzene (*Continued*)				
	68–69 27 [66]			
	66 21.5 [76]			
	65 20 [76]			
	61–62 18 [28]			
	60.5–61.5 18 [12]			
	60–62 17 [12]			
	60–61 17 [66]			
	55–60 15 [66]			
	56 15 [71]			
	54.5–55.0 14 [75]			
	54–55 14 [74]			
	56 13 [12]			
	50.0–50.5 11 [75]			

* $\frac{dD}{dt} = -0.0008111/°C$ (0 to 24°C)

† $\frac{dn}{dt} = -0.00056115/°C$ (9 to 22°C)

(a) This density is the average of two or more determinations.

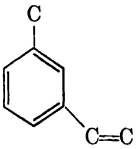
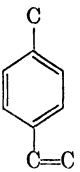
1-Methyl-2-ethenylbenzene



			1.5447	
169 752 [13]	0.8912 D_{24}^{24} [62]		1.54505(a) [71]	
168 746 [13]	0.9155 14.1° [71]		1.5425 24° [62]	
61–62 18 [57]	0.9161 13.4° [71]		1.54765 14.1° [71]	
59 15 [71]	0.9168 13.25° [71]		1.54817 13.25° [71]	
55.4 12 [71]	0.9174 12.55° [71]		1.54175 $n_{H\alpha}^{14.1}$ [71]	
51 9 [62]			1.54219 $n_{H\alpha}^{13.25}$ [71]	
			1.56444 $n_{H\beta}^{14.1}$ [71]	
			1.56499 $n_{H\beta}^{13.25}$ [71]	
			1.57904 $n_{H\gamma}^{14.1}$ [71]	
			1.58003 $n_{H\gamma}^{13.25}$ [71]	

* $\frac{dn}{dt} = -0.0005117/°C$ (13 to 24°C)

(a) This refractive index is the average of two determinations.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1-Methyl-3-ethenylbenzene 							
	164 [47]		0.9044	D_{24}^{24} [62]	1.54	24° [62]	
	61–62	18 [69]					
	52–53	9 [62]					
1-Methyl-4-ethenylbenzene 							
	170–175 [60]		0.8813	25° [51]	1.52336	25° [51]	
	170–173 [58]		0.8974	D_{24}^{24} [62]	1.5395	24° [62]	
	166–167	724 [17]			1.54465	16.4° [73]	
	77–79	33 [73]	0.896	D_{20}^{20} [41]	1.54474	16.3° [73]	
	69–70	20 [51]	0.8974	18° [26]	1.5306	16° [31]	
	65–66	19 [73]	0.9003	16.4° [73]	1.53811	$n_{H\alpha}^{16.4}$ [73]	
	63	15 [31]	0.9010	16.3° [73]	1.53820	$n_{H\alpha}^{16.3}$ [73]	
	60	12 [26]	0.9011	16.2° [73]	1.56200	$n_{H\beta}^{16.4}$ [73]	
	59–60	12 [69]	0.8978	16° [31]	1.56208	$n_{H\beta}^{16.3}$ [73]	
	51	10 [62]			1.57784	$n_{H\gamma}^{16.4}$ [73]	
					1.57797	$n_{H\gamma}^{16.3}$ [73]	

C_9H_{10} References

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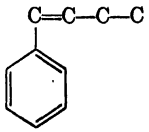
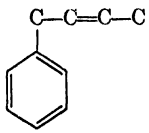
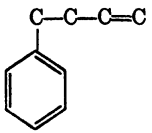
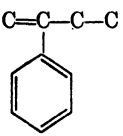
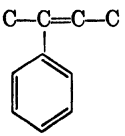
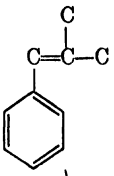
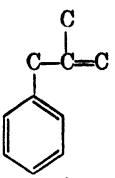
Buten-1-ylbenzene 				
	188.9			
	190–193 [46]	0.9106 [58]	1.5387 [58]	
	188–190 [41]	0.9097 19° [72]	1.54019 19.4° [72]	
	189 [36]	0.9124 16° [36]	1.5381 16° [46]	
	188–189 [1]	0.9065 13° [41]	1.5414 16° [36]	
	89–90 15 [36]	0.907 11° [56]	1.550 11° [56]	
	81.7–82.7 12.5 [72]	0.9277 D_0^{4} [46]	1.53401 $n_{H\alpha}^{19.4}$ [72]	
	85 12 [18]		1.55615 $n_{H\beta}^{19.4}$ [72]	
	80 12 [56]		1.57083 $n_{H\gamma}^{19.4}$ [72]	
	78 12 [15]			
	76–78(a) 12 [51]			
	73–74.5(b) 12 [51]			
	77 10 [58]			
	83 9 [50]			
	70–71 8 [41]			

(a) This constant was determined on the *trans* isomer.
(b) This constant was determined on the *cis* isomer.

Buten-2-ylbenzene 				
	176.2			
	176–178 [36]	0.8831 [58]	1.5101 [44,58]	
	175–177 [63]	0.9006 [45]	1.5157 19° [75]	
	176 [10]	0.9033 [44]	1.5109 15° [36]	
	176 765 [36]	0.9069 19° [75]		
	177–178 754 [2]	0.8857 15° [36]		
	81–82 21 [73]	0.8991 0° [2]		
	76 18 [36]			
	76–77.5 16 [73]			
	72–73 13 [2]			
	70 12 [15]			
	61–63 12 [75]			
	68 10 [58]			
	65.6–66 4 [45]			

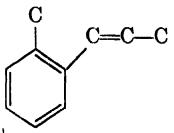
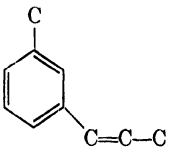
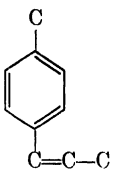
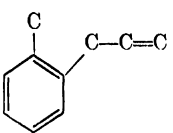
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Buten-3-ylbenzene 				
	177.2			
	177–178 [48,49]	0.8831 [58]	1.5059 [58,61]	
	176–178 [4,5]	0.8915 [44]	1.5064 [44]	
	175–178 [26,27]	0.8878 17° [37]	1.5090 [26]	
	177 [57]	0.901 15.5° [4]	1.5073 21.5° [57]	
	175–177 [19]	0.9015 15.5° [5]	1.5078 17° [37]	
	176–178 758 [3]			
	73 18 [12]			
	73–76 14 [3]			
	72–73 13 [61]			
	62.5 13 [44]			
	65 12 [56]			
	65 11 [37]			
	64 10 [58]			
2-Phenylbutene-1 				
	81–82 20 [28]			
2-Phenylbutene-2 				
	189.3			
	191–193 [33]	0.9041 [30]	1.534 [69]	
	188–191 [34]	0.909 [69]	1.52990 25° [23]	
	186–191 [6]	0.8911 25° [22,24]	1.5293 25° [61]	
	187–190 [25]	0.909 22° [34]	1.5288 22° [34]	
	187–189 [71,72]	0.9088 19.7° [71]	1.5299 21° [30]	
	184–187 752.9 [30]	0.9095 19.7° [71]	1.53387 19.7° [71]	
	91 20 [73]	0.9286 19.6° [71]	1.53496 19.7° [71]	
	80–81 20 [23,34]	0.9221 15° [33]	1.51488 $n_{H\alpha}^{25}$ [23]	
	85.5–86.5 19 [73]		1.52833 $n_{H\alpha}^{19.7}$ [71]	
	83–84 19 [73]		1.52930 $n_{H\alpha}^{19.7}$ [71]	
	81–82 17 [34]			

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}	n_D^{20}		Additional Data
2-Phenylbutene-2 (*Continued*)	78	15 [69]		1.54785	$n_{H\beta}^{19.7}$ [71]	
	73	14 [61]		1.54895	$n_{H\beta}^{19.7}$ [71]	
				1.56048	$n_{H\gamma}^{19.7}$ [71]	
				1.56172	$n_{H\gamma}^{19.7}$ [71]	
1-Phenyl-2-methylpropene-1 						
	185.5		**0.9019**			
	190 [16]		0.9014	D_{25}^{25} [53]	1.5235 [31]	
	187.3–188.3 [53]				1.5280 [35]	
	184–186 [11]		0.9047	D_{20}^{20} [53]	1.5400 [76]	
	181–183 [25,74]		0.9006	D_0^{20} [31]	1.5380	22° [76]
	180–182 [47,66,67]		0.8986	19.6° [71]	1.5390	21.0° [53]
	181 [68]				1.5400	20.4° [76]
	179–181 [65]		0.9081	D_{15}^{15} [53]	1.52733	19.6° [71]
	181–182	761 [35]	0.9022	14.5° [35]	1.53707	11° [20,21]
	183–185	748 [20,21]	0.9116	D_{10}^{10} [53]	1.52185	$n_{H\alpha}^{19.6}$ [71]
	189–192	747 [31]			1.54105	$n_{H\beta}^{19.6}$ [71]
	101	50 [76]	0.9154	D_5^{5} [53]	1.55357	$n_{H\gamma}^{19.6}$ [71]
	100	50 [76]	0.9163	D_4^{4} [53]	(a)	
	90	31 [76]	0.9172	0° [65]		
	79–80	20 [76]				
	72	15 [8]				
	63.5	10 [9]				
1-Phenyl-2-methylpropene-2 						
	69–70	20 [76]		1.5080 [76]		

* $\frac{1}{T_b} = 0.0033897 - 0.0004218 \log_{10} p_{mm}$ (10 to 50 mm)

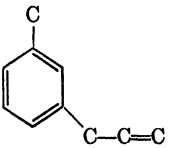
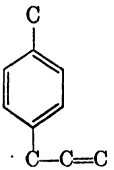
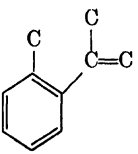
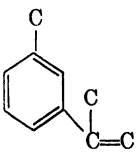
† $\frac{dD}{dt} = -0.0008420/°C$ (0 to 25°C)

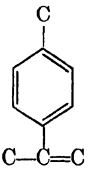
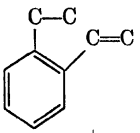
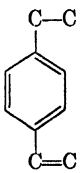
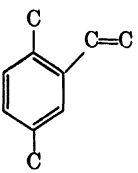
(a) Refractive indices at other lines may be found in reference 53.

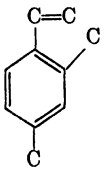
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-2-(propen-1′-yl)-benzene 				
	79.5 15 [43]	0.9017 [43]	1.5393 [43]	
1-Methyl-3-(propen-1′-yl)-benzene 				
	94.5 22 [43]	0.8954 [43]	1.5398 [43]	
1-Methyl-4-(propen-1′-yl)-benzene 				
	195–197 [40]	0.8896 [42]	1.5392 [42]	
	196 [39]	0.9057 13° [39,40]	1.5477 13° [40]	
	192 [13,14]			
	195–197 758 [42]			
	92–93 20 [32]			
	83–85 10 [39,40]			
1-Methyl-2-(propen-2′-yl)-benzene 				
		0.9005_5	1.5187	
	182–183 757 [43]	0.9001 [43]	1.5186 [43]	
	181	0.8890 35° [27]	1.5171 24° [27]	
	–181.6 750 [27]	0.8970 24.5° [27]	1.5209 14° [27]	
	93–95 30 [27]	0.9110 7° [27]	1.5255 6° [27]	
	88–90 25 [27]			

* $\frac{dD}{dt} = -0.0007847/°C$ (7 to 35°C)

† $\frac{dn}{dt} = -0.0004400/°C$ (6 to 24°C)

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-3-(propen-2′-yl)-benzene 	185–186 [60] 185 [59] 180–181 756 [43] 60–60.5 11 [42]	0.8795 [42] 0.8910 [43] 0.9035 D_0^{22} [59,60]	1.5062 [42] 1.5127 [43] 1.530 22° [59,60]	
1-Methyl-4-(propen-2′-yl)-benzene 	180–182 755 [42,43] 180–181 750 [27] 58–60 1.65 [27]	0.8830 [42,43] 0.9043 26.2° [27] 0.9157 6.8° [27]	1.5082 [27] 1.5095 [42,43] 1.5210 10° [27]	
1-Methyl-2-isopropenylbenzene 	175 [59,60] 172–173 756 [29] 59–62 11 [7]	0.9181 D_0^{15} [59,60]	1.5112 30° [7] 1.521 15° [59,60]	
1-Methyl-3-isopropenylbenzene 	185–186 [55] 183–185 [64]	0.9115 0° [64]		

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1-Methyl-4-isopropenylbenzene 							
	185.3						
	186–188 [59]		0.8936	23° [22]	1.52832	23° [22]	
	186 [60]		0.9022	18.7° [70]	1.53447	18.7° [70]	
	184–185 [64]		0.9024	18.5° [70]	1.528	16° [59,60]	
	187	780 [54]	0.9074	D_0^{16} [59,60]	1.52870	$n_{H\alpha}^{18.7}$ [70]	
	186–189	748 [22]	0.9122	0° [64]	1.54944	$n_{H\beta}^{18.7}$ [70]	
	101.5	29 [70]	0.9121	D_0^{0} [59,60]	1.56306	$n_{H\gamma}^{18.7}$ [70]	
1-Ethyl-2-ethenylbenzene 							
	68–68.5	12 [17]	0.9119 [17]		1.54221	22° [17]	
					1.53625	$n_{H\alpha}^{22}$ [17]	
					1.55796	$n_{H\beta}^{22}$ [17]	
1-Ethyl-4-ethenylbenzene 							
	86	20 [18, 32]	0.8901	25° [52]	1.52055	25° [52]	
	84–85	19 [52]	0.8953	15° [38]	1.5377	15° [38]	
	68	11 [38]	0.9074	13° [32]			
1,4-Dimethyl-2-ethenylbenzene 							
	69	10 [38]	0.9072	17.5° [38]	1.5236	17.5° [38]	

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1-Ethenyl-2,4-dimethylbenzene 							
	79–80	12 [38]	0.9022	21.5° [38]	1.5214	21.5° [38]	

$C_{10}H_{12}$ References

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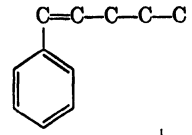
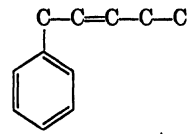
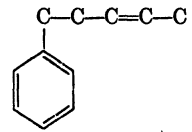
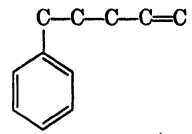
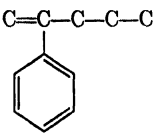
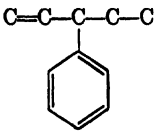
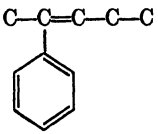
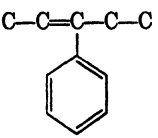
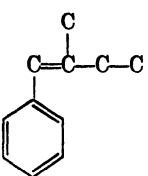
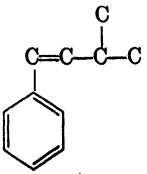
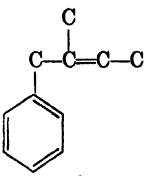
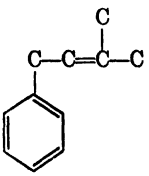
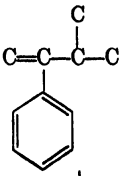
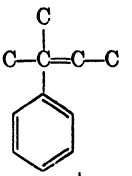
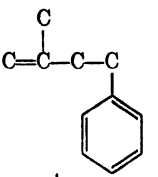
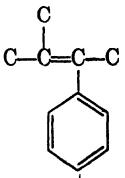
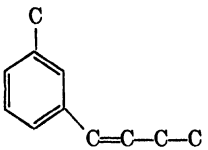
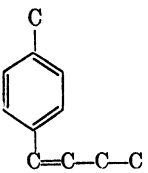
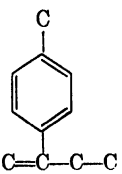
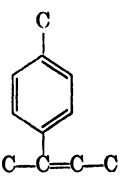
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Penten-1-ylbenzene 	217 [44] 210–215 [39] 202–205 [63] 87.5 9 [44] 82 9 [27]	0.8782 [63] 0.8924 17° [44] 0.892 15° [27]	1.51575 [63] 1.5302 18° [39] 1.5318 17° [44]	
Penten-2-ylbenzene 	201 [28] 111 30 [28] 97–98 19 [60] 92.0–92.3 18.5 [60] 80 12 [27]	0.8884 16.2° [60] 0.8837 16° [27]	1.50890 16.2° [60] 1.5059 16° [27] 1.50444 $n_{H\alpha}^{16.2}$ [60] 1.51986 $n_{H\beta}^{16.2}$ [60] 1.52958 $n_{H\gamma}^{16.2}$ [60]	
Penten-3-ylbenzene 	92–94 16 [2]	0.876 D_{21}^{21} [2]	1.5090 21° [2]	
Penten-4-ylbenzene 	206 [50] 203–204 [62] 198 [46,64] 94–98 16 [61] 77–78 10 [62]	0.8889 [62]	1.5065 [62] 1.5060 23° [46]	
2-Phenylpentene-1 	198–202 [55] 198–200 [55]	0.9138 0° [55,56]		

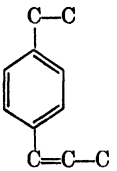
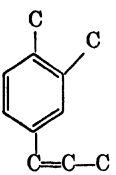
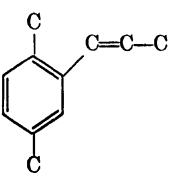
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}		n_D^{20}		Additional Data
3-Phenylpentene-1 	173–177 718.8 [9]	0.8458	23° [9]			
2-Phenylpentene-2 	199.2 199–201 [56] 199–200 [22] 199 [20] 197–199 [55] 89–90 16 [20] 86 14 [22]	0.8950 0.8976 0.9321	26.5° [22] 21.2° [20] 0° [55]	1.5196	26.5° [22]	
3-Phenylpentene-2 	197–198 753 [23] 195–197 750 [12] 91–93 18 [23] 87–89 17 [16] 90 13 [3] 84–86 12 [3]	0.908 0.9173	21° [16] 14° [23]	1.5300 1.5266	21° [16] 15° [23]	
1-Phenyl-2-methylbutene-1 	201–202 [40] 199–200 769 [57] 98–100 23 [57]			1.528	18° [40]	

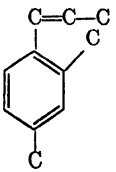
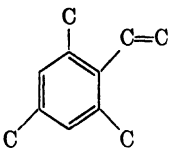
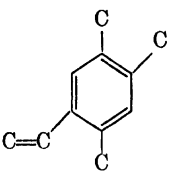
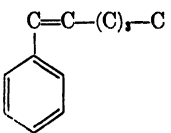
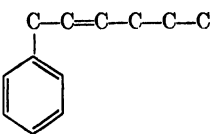
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}		n_D^{20}		Additional Data
1-Phenyl-3-methylbutene-1 						
	201.7					
	204–206 [56]	0.878	16° [53]	1.5251 [37,59]		
	201–203 [39]	0.8903	14.6° [26,59]	1.532	18° [39]	
	201–202 [37,52,59]	0.887	14.4° [59]	1.5248	14.6° [26,59]	
	207 757 [26,59]	0.887	14° [37]			
	200.5 –201.5 737 [53]	0.9191	D_0^4 [39]			
	102–103 26 [26,59]					
	84–86 13 [49]					
1-Phenyl-2-methylbutene-2 						
	198–203 [17]					
1-Phenyl-3-methylbutene-2 						
	205 [26]	0.891	18.3° [26]	1.5125	18.3° [26]	
	198–202 [17]	0.8944	15° [27]	1.5115	15° [27]	
	205 –206.5 751 [7]	0.8958	D_{15}^{15} [7]			
	92 15 [26]					
	90 12 [54]					
	83 11 [27]					

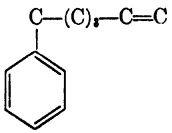
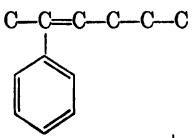
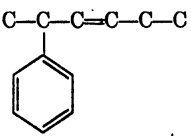
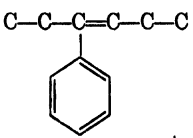
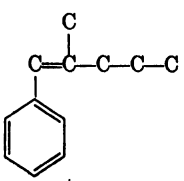
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Phenyl-3-methylbutene-1 				
	191–192 753 [23] 82 12 [23]	0.8991 13.1° [23]	1.5181 13.8° [23]	
2-Methyl-2-phenylbutene-2 				
	192–193.5 [59] 190.5–192 [59] 89–90 22 [59]	0.8970 19.8° [59] 0.8935 19.4° [59] 0.8968 19.1° [59]	1.51997 19.8° [59] 1.51897 19.4° [59] 1.51989 19.1° [59] 1.51494 $n_{H\alpha}^{19.8}$ [59] 1.51389 $n_{H\alpha}^{19.4}$ [59] 1.51481 $n_{H\alpha}^{19.1}$ [59] 1.53217 $n_{H\beta}^{19.8}$ [59] 1.53097 $n_{H\beta}^{19.4}$ [59] 1.53200 $n_{H\beta}^{19.1}$ [59] 1.54311 $n_{H\gamma}^{19.8}$ [59] 1.54185 $n_{H\gamma}^{19.4}$ [59] 1.54291 $n_{H\gamma}^{19.1}$ [59]	
2-Methyl-4-phenylbutene-1 (a) 				
	205 [21]			

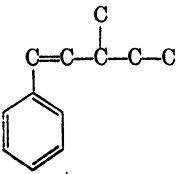
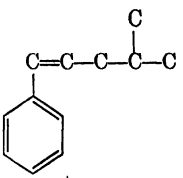
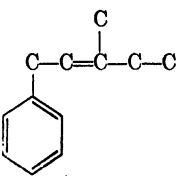
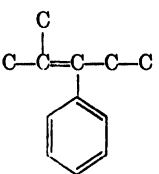
(a) The structure of this compound is questionable.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Methyl-3-phenylbutene-2 	190.5–192.0 [80] 190 [38] 83 12 [38] 70 8 [38]	0.8917 [38] 0.9080 6° [38]	1.51835 [38]	
1-*m*-Tolylbutene-1 	208 [15,19]	0.8901 18° [14,15]	1.5365 18° [14]	
1-*p*-Tolylbutene-1 	210–212 [33,34] 92–93 15 [34] 88–90 7 [34]	0.8893 [33,34]	1.4385 [34]	
2-*p*-Tolylbutene-1 	206–209 750 [15]	0.8926 22.5° [15]	1.52735 22.5° [15]	
2-*p*-Tolylbutene-2 	93.5–94 10 [51]			

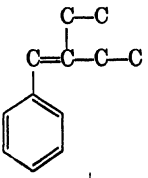
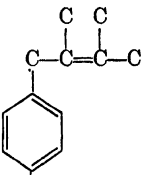
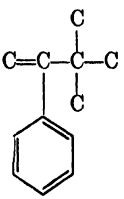
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Ethyl-4-(propen-1′-yl)-benzene 				
	216–218 [33,35] 105–107 17 [33]	0.9072 18° [33,35]	1.5437 18° [35]	
Ethenylisopropylbenzene (a)				
	203–206 [42] 203–204 [43] 201–202 [10] 76 10 [30]	0.8799 15° [30] 0.8902 15° [42,43]	1.5198 15° [30]	
(a) The structure of this compound is not given.				
1,2-Dimethyl-4-(propen-1′-yl)-benzene 				
	224–226 [33] 165–168 16 [33] 110–112 16 [35]	0.9151 18° [33,35]	1.5558 18° [35]	
1,4-Dimethyl-2-(propen-1′-yl)-benzene 				
	220–223 [35] 219–223 [36] 84–88 8 [35,36]	0.9259 22° [35,36]	1.5435 22° [35]	

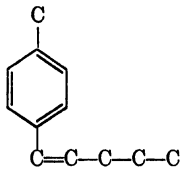
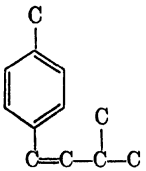
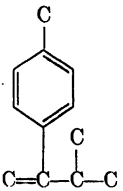
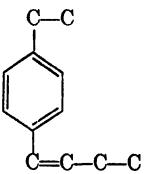
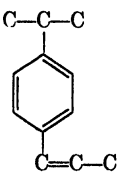
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-(Propen-1′-yl)-2,4-dimethylbenzene 				
	206–208 [33,35] 213–215 735 [4] 100 20 [4] 85–88 10 [33,35]	0.9096 17.5° [4] 0.903 13° [33,35]	1.540 17.5° [4] 1.5342 13° [35]	
1,3,5-Trimethyl-2-ethenylbenzene 				
	208–210 [29] 203–205 [19] 92 14 [19] 83 12 [4A]	0.9057 [19] 0.9073 17.5° [30]	1.5296 17.5° [30]	
1,2,4-Trimethyl-5-ethenylbenzene 				
	219–220 [29] 97 22 [29] 97 13 [30]	0.9137 17° [30]	1.5379 17° [30]	
$C_{12}H_{16}$				
Hexen-1-ylbenzene 				
	97–100 8 [41]	0.9455 25° [41]	1.5377 25° [41]	
Hexen-2-ylbenzene 				
	108 16 [28]	0.8898 16° [28]	1.5058 16° [28]	

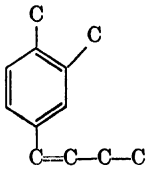
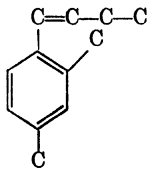
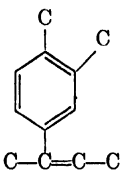
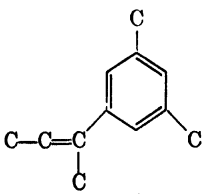
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Hexen-5-ylbenzene 	216 [46] 119 30 [46] 104 17 [50] 94.5–95 10 [32] 94–95 10 [62]	0.8839 [62]	1.5033 [62] 1.5010 25° [46]	
2-Phenylhexene-2 	223–226 [8]			
2-Phenylhexene-3 	84 10 [48]			
3-Phenylhexene-3 	216 [65]			
1-Phenyl-2-methylpentene-1 	212–215 768 [40]	0.9926 0° [40]	1.521 17° [40]	

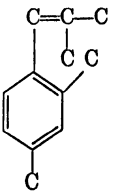
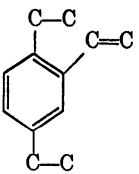
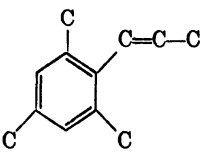
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-3-methylpentene-1 				
	126 15 [31] 100–103 9 [31,59]	0.8906 15° [31,59] 0.9146 12° [31]	1.5277 15° [31,59] 1.5243 12° [31]	$[\alpha]_D^{15}$ = +50.3° [31] $[\alpha]_D^{12}$ = +43.0° [31]
1-Phenyl-4-methylpentene-1 				
	107–109 11 [47]			
1-Phenyl-3-methylpentene-2 				
	226 749 [26,27] 119–120 20 [27] 103–104 15 [26]	0.9004 18° [26] 0.9014 18° [27]	1.5100 18° [26,27]	
2-Methyl-3-phenylpentene-2 				
	195–198 [1] 206–207 765 [25] 97.2–97.8 24 [59] 83–84 15 [25]	0.8886 17.5° [59] 0.8913 14.5° [25]	1.51422 17.5° [59] 1.5134 14.5° [25] 1.50950 $n_{H\alpha}^{17.5}$ [59] 1.52569 $n_{H\beta}^{17.5}$ [59] 1.53575 $n_{H\gamma}^{17.5}$ [59]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Phenyl-3-methylpentene-2	204–206 [1] 206.5 -207 764 [11] 99.5–100 22 5 [11]	0.8859 [11] 0.8921 14 7° [11] 0.9020 0° [11]	1.50814 [11]	
2-Methyl-4-phenylpentene-2	210–211 755 [26] 98–100 19 [26]	0.8931 [26]	1.5162 [26]	
2-Phenyl-4-methylpentene-2	207 764 [26] 216–220 738 [5] 99–101 20 [26] 111–115 18 [5]	0.909 16° [5] 0.8948 15° [26]	1.5231 16° [5] 1.516 15° [26]	
1-Phenyl-4-methylpentene-3	108–112 25 [6]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-2-ethylbutene-1 				
	216–218 [40]	0.8924 18.7° [59]	1.51677 18.7° [59]	
	106–108 19.5 [59,60]	0.9038 18.5° [25]	1.5182 18.5° [25]	
	97–98 13 [25]	0.9038 18° [40]	1.51656 18° [59]	
	97.3 13 [59]	0.9040 18° [59]	1.5182 18° [40]	
			1.51199 $n_{H\alpha}^{18.7}$ [63]	
			1.51151 $n_{H\alpha}^{18}$ [59]	
			1.52837 $n_{H\beta}^{18.7}$ [59]	
			1.52983 $n_{H\beta}^{18}$ [59]	
			1.53866 $n_{H\gamma}^{18.7}$ [59]	
			1.53830 $n_{H\gamma}^{18}$ [59]	
1-Phenyl-2,3-dimethylbutene-2 				
	220–221 750 [7]	0.903 D_{15}^{15} [7]		
2-Phenyl-3,3-dimethylbutene-1 				
	88–92 15 [45]	0.8839 25° [45]	1.50133 25° [45]	
			1.49708 $n_{H\alpha}^{25}$ [45]	
			1.51185 $n_{H\beta}^{25}$ [45]	
			1.52106 $n_{H\gamma}^{25}$ [45]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-*p*-Tolylpentene-1 	221–224 [15]			
1-*p*-Tolyl-3-methylbutene-1 	221–222 [37] 106–107 10–11 [37]	0.885 18° [37]	1.5316 20° [37]	
2-*p*-Tolyl-3-methylbutene-1 	210–212 [15]	0.8838 27° [15]	1.52543 27° [15]	
1-Ethyl-4-(buten-1′-yl)-benzene 	230–233 [34] 98–102 7 [34]	0.9074 [34]	1.5405 [34]	
1-Isopropyl-4-(propen-1′-yl)-benzene 	141–146 28 [33,35] 121–125 19 [33,35]	0.9308 22° [33,35]	1.5430 22° [35]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Isopropylpropen-2-ylbenzene (a)				
	229–230 [43]	0.8900 15° [43]		
(a) The structure of this compound is not given.				
1,2-Dimethyl-4-(buten-1′-yl)-benzene 				
	238–239 [34] 122–124 18 [34]	0.9114 15° [34]	1.5458 [34]	
1-(Buten-1′-yl)-2,4-dimethylbenzene 				
	226–228 [33,34] 114 21 [19] 109–111 16 [33,34]	0.8937 19° [19] 0.8967 18° [33,34]	1.5349 [34]	
1,2-Dimethyl-4-(2′-buten-2′-yl)-benzene 				
	85–87 10 [12]	0.891 16° [12]	1.51255 16° [12]	
1,3-Dimethyl-5-(2′-buten-2′-yl)-benzene 				
	218–221 [53]	0.892 [53]		

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-(2′-Methylpropen-1′-yl)-2,4-dimethylbenzene 				
	210 [18]	0.886 25° [18]	1.523 25° [18]	
	108–109 16 [18]	0.916 0° [18]	1.526 19° [18]	
	96–97 12 [18]			
1,4-Dimethylbutenylbenzene (a)				
	221 [34]			
	117–120 17 [34]	0.8958 18° [34]	1.5280 [34]	
(a) The structure of this compound is not given.				
1,4-Diethyl-2-ethenylbenzene 				
	96–97 12 [30]	0.8915 16° [30]	1.5139 16° [30]	
1,3,5-Trimethyl-2-(propen-1′-yl)-benzene 				
	223–224 745 [24]	0.8988 21° [24]	1.5229 21° [24]	
	109–110 18 [24]	0.9003 17.5° [19]		
	103 13 [19]			

$C_{11}H_{14}$ and $C_{12}H_{16}$ References

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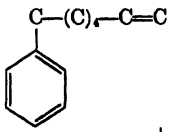
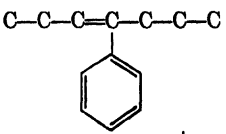
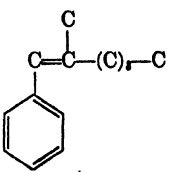
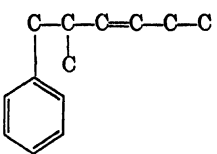
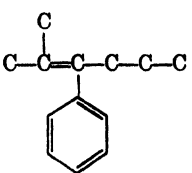
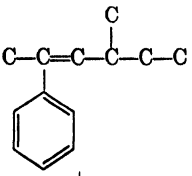
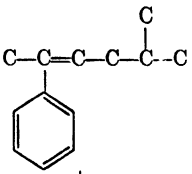
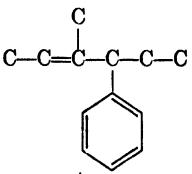
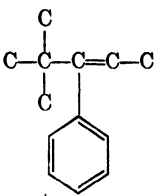
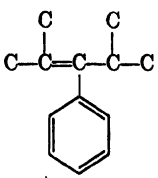
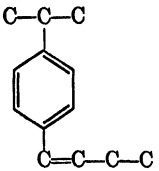
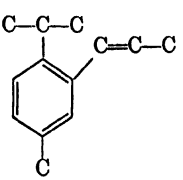
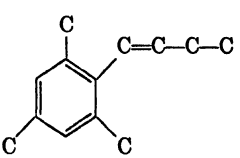
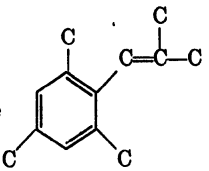
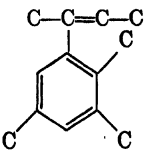
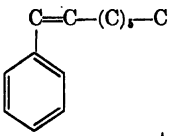
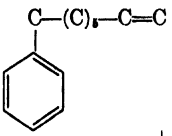
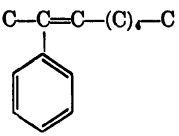
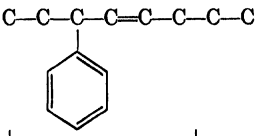
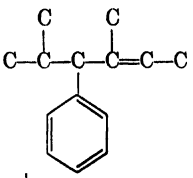
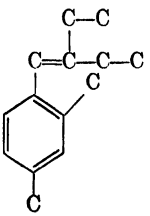
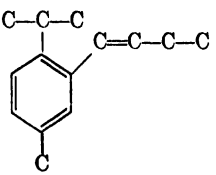
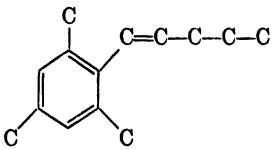
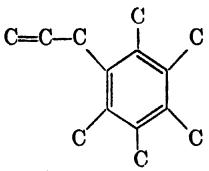
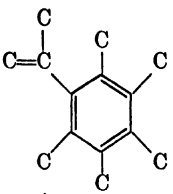
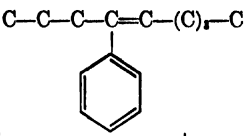
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Hepten-6-ylbenzene 	236 [29] 123 24 [29]		1.5007 22° [29]	
4-Phenylheptene-3 	228 [1,24,25]	0.8855 15° [25]	1.522 15° [25]	
1-Phenyl-2-methylhexene-1 	114–116 12 [30]	0.8974 17° [30]	1.51505 17° [30]	
1-Phenyl-2-methylhexene-3 	106–110 16 [2]	0.875 D_{21}^{21} [2]	1.4905 21° [2]	
2-Methyl-3-phenylhexene-2 	210–212 755 [14] 94–96 12 [14]	0.8897 16° [14]	1.5070 16° [14]	

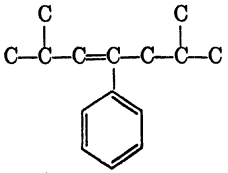
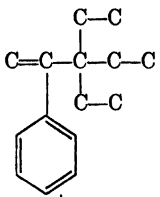
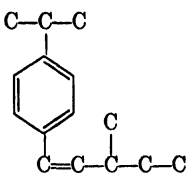
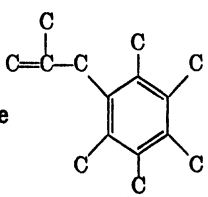
M. P.,°C	B. P.,°C @ 760mm	D^{20}	n_D^{20}	Additional Data
2-Phenyl-4-methylhexene-2 	142 50 [6]	0.8839 25° [6]	1.5117 25° [6]	
2-Phenyl-5-methylhexene-2 	121 20 [12]	0.8814 15° [12]		
3-Methyl-4-phenylhexene-2 	91.75 -92.5 8 [7]	0.8861 [7] 0.891 13.6° [7]	1.50644 13.6° [7]	
2,2-Dimethyl-3-phenylpentene-3 	95–100 14 [28] 91–93 12 [28]	0.9064 25° [28]	1.51550 25° [28] 1.51100 $n_{H\alpha}^{25}$ [28] 1.52710 $n_{H\beta}^{25}$ [28] 1.53776 $n_{H\gamma}^{25}$ [28]	
2,4-Dimethyl-3-phenylpentene-2 	225–228 [23,26]			

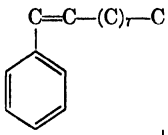
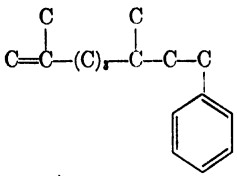
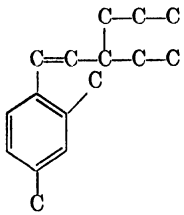
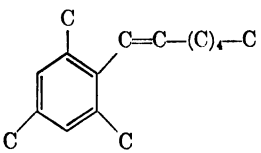
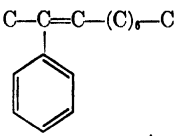
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Isopropyl-4-(buten-1′-yl)-benzene 	242–243 [19]	0.8932 14° [19]	1.5330 [19]	
Isopropylbuten-1-ylbenzene (a)				
124–125.5 [9]				
(a) The position of the substituents in benzene is not given.				
1-Isopropyl-4-isobutenylbenzene (a)				
	236–238 [37]			
(a) The position of the double bond in isobutenyl is not given.				
1-Isopropylphenyl-2-methylpropene-1 (a)				
	235–236 745 [36] 105–106 10 [36]			
(a) The position of the substituents in benzene is not given.				
1-Isopropyl-2-(propen-1′-yl)-4-methylbenzene 	226–228 [17,18] 128–131 32 [17,18]	0 8899 19° [18] 0.8899 18° [17]	1.5225 19° [18]	
1,3,5-Trimethyl-2-(buten-1′-yl)-benzene 	118–119 14 [11]	0.8953 14° [11]		

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
,3,5-Trimethyl-2-(isobuten-1′-yl)-benzene 	226–227 745 [13] 118–120 14 [13] 103–106 5 [20]	0.8900 18.8° [13]	1.5162 18.8° [13]	
1-(2′-Buten-2′-yl)-2,3,5-trimethylbenzene 	234–236 [12]	0.8992 15° [12]		
$C_{14}H_{20}$				
Octen-1-ylbenzene 	136–138 13 [30]	0.9063 17° [30]	1.50728 17° [30]	
Octen-7-ylbenzene 	115–117 8 [40]	0.8792 [40]	1.4995 [40]	
2-Phenyloctene-2 	121–122 10 [27]	0.8810 D_{17}^{17} [27]	1.49459 17° [27]	

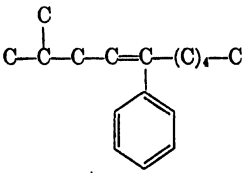
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Phenyloctene-4 	104 8 [31]			
2,4-Dimethyl-3-phenylhexene-4 	224–226 [42] 102 13 [42]	0.8892 19.7° [42]	1.50444 $n_{H\alpha}^{19.7}$ [42] 1.51890 $n_{H\beta}^{19.7}$ [42] 1.52793 $n_{H\gamma}^{19.7}$ [42] 1.50889 $n_{He}^{19.7}$ [42]	
1-(2-Ethylbuten-1′-yl)-2,4-dimethylbenzene 	242 [8] 134–135 15 [8] 122–123 10–11 [8]	0.887 28° [8] 0.914 10° [8] 0.927 0° [8]	1.513 28° [8]	
1-Isopropyl-2-(buten-1′-yl)-4-methylbenzene 	241–244 [19]	0.9353 14° [19]	1.5274 [19]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3,5-Trimethyl-2-(penten-1′-yl)-benzene 	239–240 758 [13] 136 22 [13]	0.8901 [13]	1.5114 [13]	
Pentamethylpropen-2-ylbenzene 				
135 [3,32]				Sublimation Point 128 [3,4,32]
Pentamethylisopropenylbenzene 				
134(a) [32]				Sublimation Point 122 [3] 121 [32]
(a) Decomposition takes place at the boiling point.				
$C_{15}H_{22}$				
4-Phenylnonene-4 	117–121 6 [27]	0.8882 D_{20}^{20} [27]	1.5012 [27]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,6-Dimethyl-4-phenylheptene-3 	124–126 20 [38] 110–112 10 [38]	0.8731 16° [38]	1.49762 25° [38]	
2-Phenyl-3,3-diethylpentene-1 	130–132 15 [28]			
1-Isopropyl-4-(3′-methylpenten-1′yl)-benzene 	139–140.5 9.5 [15]	0.8801 16° [15]	1.5181 16° [15]	$[\alpha]_D^{16}$ = +41.89° [15]
Pentamethyl-(2-methylpropen-2-yl)-benzene 				Sublimation Point 122 [4]

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Decen-1-ylbenzene 	162–163 14 [29]			
2,6-Dimethyl-8-phenyloctene-1 	145–146 9.5 [16]	0.8844 11.5° [16]	1.5029 11.5° [16]	$[\alpha]_D^{17}$ = −7.26° [16]
1-(3′-Propylpenten-1′-yl)-2,4-dimethylbenzene 	160.5 23 [8] 143 15 [8]	0.915 19° [8] 0.928 0° [8]	1.508 19° [8]	
1,3,5-Trimethyl-2-(hepten-1′-yl)-benzene 	270–272 [13] 170–171 23 [13]	0.8844 17° [13]	1.5136 17° [13]	
$C_{17}H_{26}$ **2-Phenylundecene-2** 	166–170 11 [39]	0.8801(a) [39]		

(a) The temperature for this density is not given.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Methyl-5-phenyldecene-4 				
	153–155 18 [38]	0.8866 26° [38] 0.9171(a) 17° [38] 0.8859 0° [38] 0.9301(a) 0° [38]	1.49913 26.5° [38]	

(a) These densities were determined on a sample treated differently from that on which the other data were determined.

$C_{18}H_{28}$ **2-Phenyldodecene** (a)				
	125 0.8 [35]	0.8761 [35] 0.8692 30° [35]	1.5035 [35]	

(a) The position of the double bond is not given.

3-Phenyldodecene (a)				
	145–146 2.0 [35]	0.8712 [35] 0.8640 30° [35]	1.5001 [35]	

(a) The position of the double bond is not given.

4-Phenyldodecene (a)				
	118–120 0.8 [35]	0.8726 [35] 0.8662 30° [35]	1.5025 [35]	

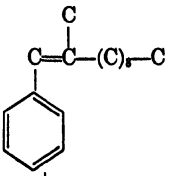
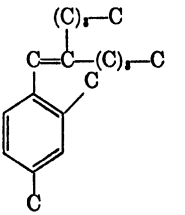
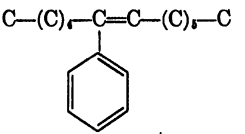
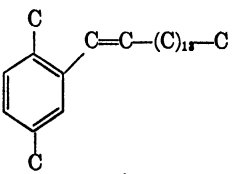
(a) The position of the double bond is not given.

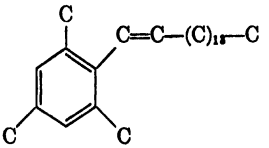
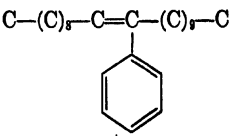
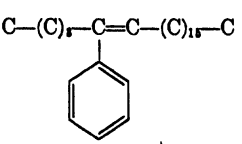
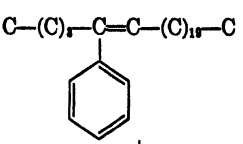
5-Phenyldodecene (a)				
	131–132 1 [35]	0.8755 [35] 0.8680 30° [35]	1.5027 [35]	

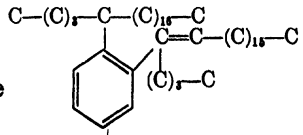
(a) The position of the double bond is not given.

6-Phenyldodecene (a)				
	127 1.0 [35]	0.8718 [35] 0.8846 30° [35]	1.5055 [35]	

(a) The position of the double bond is not given.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-2-methylundecene-1 	180 13 [39] 177–178 12 [39]	0.8790(a) [39]		
(a) The temperature for this density is not given.				
1-(2′-*n*-Butylhexene-1′-yl)-2,4-dimethylbenzene 	286–288 [8] 173 20 [8] 145 6 [8]	0.889 27° [8]	1.5025 27° [8]	
$C_{19}H_{30}$  **6-Phenyltridecene-6**	153–154 8 [27]	0.8774 D_{18}^{18} [27]	1.49810 18° [27]	
$C_{24}H_{40}$  **1,4-Dimethyl-2-(hexadecen-1′-yl)-benzene**	254 17 [11]	0.868 [11]		

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1,3,5-Trimethyl-2-(hexadecen-1′-yl)-benzene 							
28.5–29 [11]	260	23 [11]					
$C_{27}H_{46}$  **11-Phenylheneicosene-10**							
			0.8638		**1.4922**		
48.2 [23]	203	1.0 [5,41]	0.8636 [5,23,41]		1.4922 [5,23,41]		
	190	0.5 [5]	0.8113	98.9° [5]	1.4845	40.0° [5]	
			0.8376	60° [5]	1.4884	30.0° [5]	
			0.8520	37.8° [5]			
			0.8770	0° [34]			
* $\frac{dD}{dt} = -0.0006626$/°C (0 to 99°C)							
† $\frac{dn}{dt} = -0.000385$/°C (20 to 40°C)							
Bombicestene (a)							$[\alpha]_D^{26} = -58.2°$ [10]
91–92 [10]							
(a) The structure of this compound is not given.							
$C_{28}H_{48}$  **5-Phenyldocosene-5**							
	205–210	1 [22]	0.8675	25° [21]	1.4899	25° [21]	
$C_{32}H_{56}$  **5-Phenylhexacosene-5**							
			0.8580	25° [21]	1.4909	25° [21]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-(5′-Docosyl)-2-(5″-docosen-5″-yl)-benzene 				
31.5 [21]		0.8520(a) 25° [21]	1.4848 25° [21]	

(a) This density is an extrapolated value.

$C_{13}H_{18}$-$C_{50}H_{92}$ References

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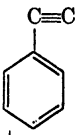
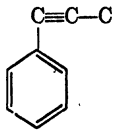
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Ethynylbenzene 				*
	142.4	**0.9300**	**1.5489**	
−44.8 [68]	144–145 [22]	0.9281 [19]	1.548 [11]	
	142–144 [29,30,61]	0.9295 [18,75]	1.5485 [19]	
	142–143 [11,58,68]	0.930 [11]	1.54935 [40]	
	141–143 [2]	0.93125 [40]	1.5461 26° [74]	
	140–143 [74]	0.80832 141.6° [77]	1.55012 17.4° [21]	
	142(a)	0.9246 25° [72]	1.5513 13.4° [71]	
	141–142 [9,54,56,71]	0.9265 23.1° [75]	1.5524 12.5° [54]	
	140–142 [20]	0.927 22° [58]	1.54095 $n_{H\alpha}^{23.0}$ [75]	
	141.70–141.75 [72]	0.930 22° [71]	1.54160 $n_{H\alpha}^{20.0}$ [18,75]	
	141.6 [77]	0.930 D_{20}^{20} [68]	1.54304 $n_{H\alpha}^{20.0}$ [40]	
	141.5 [76]		1.54374 $n_{H\alpha}^{17.4}$ [21]	
	140.5–141 [13]	0.9332 D_{20}^{20} [32]	1.5446 $n_{H\alpha}^{13.4}$ [71]	
	139–141 [32]	0.9371 12.5° [54]	1.54604 $n_{H\alpha}^{12.5}$ [54]	
	138–141 [56]	0.94658 0° [77]	1.56371 $n_{H\beta}^{23.0}$ [75]	
	139.8–140.6 [49]		1.56456 $n_{H\beta}^{20.0}$ [18,75]	
	140 [44,63]		1.56569 $n_{H\beta}^{20.0}$ [40]	
	139–140 [18,26]		1.5675 $n_{H\beta}^{13.4}$ [71]	
	139 [34]		1.57986 $n_{H\beta}^{12.5}$ [54]	
	138–139 [60]		1.57843 $n_{H\gamma}^{23.0}$ [75]	
	138 [23]		1.57899 $n_{H\gamma}^{20.0}$ [18,75]	
	141–142 758.9 [62]		1.5810 $n_{H\gamma}^{13.4}$ [71]	
	140–141 750 [35]		1.59856 $n_{H\gamma}^{12.5}$ [54]	
	141–142 720.5 [50]		1.5471 $n_{He}^{23.0}$ [75]	
	75 90 [19]			
	44 18 [5]			
	38 15 [61]			
	39–40 14 [36]			

* $\frac{dD}{dt} = -0.0008445/°C$ (0 to 25°C)

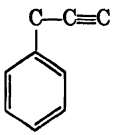
† $\frac{dn}{dt} = -0.0004541/°C$ (12 to 26°C)

(a) The boiling point 142 is found in references 31, 33, 57, 66, 67, 78.

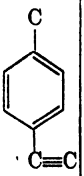
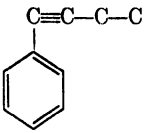
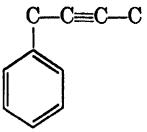
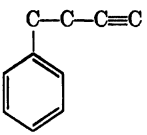
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Propyn-1-ylbenzene 				*
	182.9	**0.9380**		
	185.0 [65]	0.938 [17]	1.565 [17]	
	181–185 [70]	0.9388 [19]	1.5650 [19]	
	182–183 [79]	0.939 D_{20}^{20} [48]	1.56470 [25]	
	181–182 [59]	0.944 17° [71]	1.561 18° [71]	
	181(a) [45]	0 9393 16° [25]	1.563 15° [15]	
	113 84 [19]	0.942 15° [15]		
	76 17 [51]	0.9545 0° [25]		
	76 16 [12]			
	75 16 [45]			
	71–74 15 [71]			
	74–75 14 [89]			
	73 13 [15,17]			
	72 13 [8]			
	71–71.5 12 [25]			
	70 11 [12,14]			

* $\frac{dD}{dt} = -0.0008119$/°C (0 to 20°C)

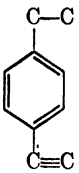
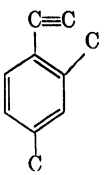
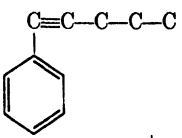
(a) The author states that polymerization takes place at the boiling point.

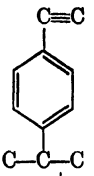
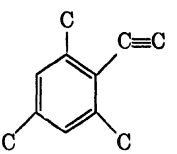
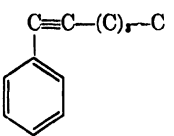
Propyn-2-ylbenzene 				
	166(a) [45]	0.932 [15]	1.5272 [16]	
	70–71 20 [45,46]	0.936 [16]	1.535 [15]	
	69.5–70 18 [11]	0.931 28° [27]	1.53481 23° [27]	
	68–69 17 [6]	0.939 D_{20}^{20} [45]		
	68–68.5 16 [15]	0.938 15° [12A]		
	67 16 [16]			
	67 15 [11]			
	67–68 14 [4]			
	65.5–66 14 [12]			
	63 11 [14]			

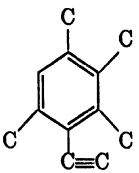
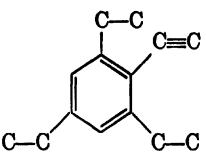
(a) The author states that polymerization take place at the boiling point.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-4-ethynylbenzene 				
23 [24,42]	168–170 [41,42]	0.9159 [60]	1.5447 25° [60]	
	168 [24]	0.903 18° [41]	1.5475 17° [41]	
	63 20 [36]	0.912 18° [42]		
	66–67 18 [64]			
	65–67 18 [60]			
	55–60 15 [41]			
$C_{10}H_{10}$				
Butyn-1-ylbenzene 				
	201–203 [52,53]	0.9210 [37]	1.537 18° [71]	
	87–90 18 [4,71]	0.923 21° [52,53]		
	82 5 [37]	0.915 18° [71]		
Butyn-2-ylbenzene 				
	80 10 [47]	0.9261 [47]	1.5480 [47]	
Butyn-3-ylbenzene 				
	190–191 [55]	0.9375 0° [2]		
	189–191 [2]	0.9391 0° [3]		
	189–191 758 [3]			
1-Methyl-2-propynylbenzene (a)				
	80 15 [7]	0.940 14° [7]	1.532 14° [7]	
		0.951 0° [7]		

(a) The position of the triple bond is not given.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1-Methyl-4-propynylbenzene (a)							
	83	15 [7]	0.947	14° [7]	1.533	14° [7]	
			0.958	0° [7]			
(a) The position of the triple bond is not given.							
1-Ethyl-4-ethynylbenzene 							
	190–192 [41]		0.9088	25° [60]	1.5360	25° [60]	
	72–74	16 [60]	0.9086	18° [41,43]	1.547(a) [41]		
	110	10 [43]	0.9128	16° [41]			
(a) The temperature for this refractive index is not given.							
1-Ethynyl-2,4-dimethylbenzene 							
	184–186	756 [28]	0.9258	12° [28]	1.5438	12° [28]	
	85	22 [28]					
$C_{11}H_{12}$							
Pentyn-1-ylbenzene 							
	212–215 [71]		0.911	18° [71]	1.540	18° [71]	
	100–101	21 [71]			1.5449	14.0° [71]	
	102–103	18.5 [10]			1.5392	$n_{H\alpha}^{14.0}$ [71]	
					1.5601	$n_{H\beta}^{14.0}$ [71]	
					1.5743	$n_{H\gamma}^{14.0}$ [71]	

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1-Ethynyl-4-isopropylbenzene 							
	79–81	12 [60]	0.9037	25° [60]	1.5296	25° [60]	
1-Propynyl-2,4-dimethylbenzene (a)							
	95	15 [7]	0.941	14° [7]	1.534	14° [7]	
			0.952	0° [7]			
(a) The position of the triple bond is not given.							
1,4-Dimethyl-2-propynylbenzene (a)							
	98	15 [7]	0.939	14° [7]	1.531	14° [7]	
			0.951	0° [7]			
(a) The position of the triple bond is not given.							
1,3,5-Trimethyl-2-ethynylbenzene 							
2.7–3.5 [73]	103–107	23 [73]	0.9185	25° [73]	1.5429	25° [73]	
	100.6						
	−101.5	20 [73]					
$C_{12}H_{14}$							
Hexyn-1-ylbenzene 							
	229–232 [71]		0.9024 [37]		1.5347 [37]		
	119–121	18 [10]	0.899	17° [71]	1.529	14.0° [71]	
	114–115	14 [71]			1.5292	$n_{H\alpha}^{20}$ [37]	
	109–110	12 [37]			1.5248	$n_{H\alpha}^{14.0}$ [71]	
	94–95	4 [37]			1.5485	$n_{H\beta}^{20}$ [37]	
					1.5304	$n_{H\beta}^{14.0}$ [71]	
					1.521	$n_{H\gamma}^{20}$ [37]	
					1.5440	$n_{H\gamma}^{14.0}$ [71]	

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1-Propynyl-4-isopropylbenzene (a)							
	101	15 [7]	0.924 0.933	14° [7] 0° [7]	1.523	14° [7]	
(a) The position of the triple bond is not given.							
1-Methyl-4-isopropylethynyl-benzene (a)							
	128–130	50 [41,43]	0.8882 0.898	17° [41,43] 10° [41]	1.527(b) [41]		
(a) The position of the ethynyl group is not given. (b) The temperature for this refractive index is not given.							
1,2,3,5-Tetramethyl-4-ethynylbenzene 							
	86	1 [1]	0.9463 [1]		1.5561 [1]		
$C_{13}H_{16}$ ***n*-Pentylethynylbenzene** (a)							
	126–127	15 [10]					
(a) The structure of this compound is not given.							
$C_{14}H_{18}$ **1-Tolylheptyne-1** (a)							
	260–262 [38]						
(a) The position of the methyl group in the tolyl radical is not given.							
1,3,5-Triethyl-2-ethynylbenzene 							
	124–126	14–16 [41]	0.9004	21° [41]			

References on Benzene With One Alkynyl Substitution

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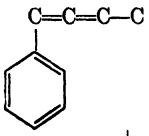
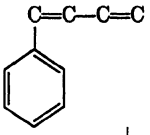
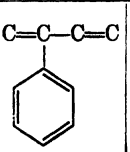
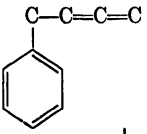
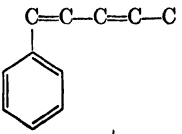
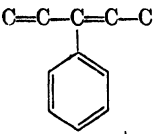
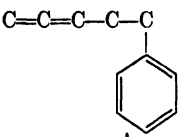
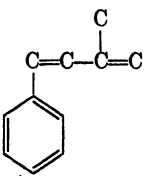
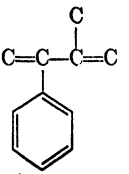
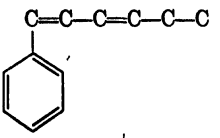
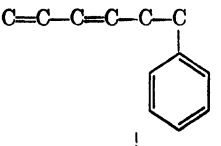
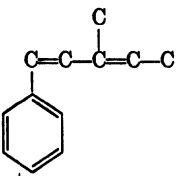
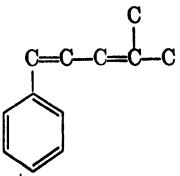
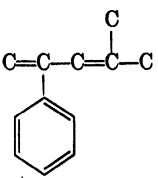
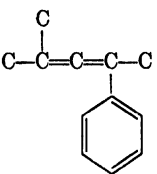
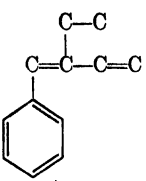
M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1-Phenylbutadiene-1,2 							
	76–77	10 [1]	0.9240	26.5° [1]	1.5754 [1]		
	44–47	0.5–1.0 [1]			1.5698	30° [1]	
					1.5716	24° [1]	
1-Phenylbutadiene-1,3 							
4.5 [28]	95	20 [28]	0.9286 [28]		1.5920(b)	28° [31]	
	96	18 [35]	0.928	D_{20}^{20} [29]	1.5950(a)	28° [31]	
	94–96	18 [19]	0.9309	16° [22,39]	1.6093	18° [18]	
	90–92	16 [11]	0.9316	15° [22]	1.60895	16.2° [7]	
	93–96	15 [4]	0.9333	14.9° [39]	1.61283	16° [22,39]	
	90	15 [22,39]			1.6140	16° [20]	
	88–89	15 [39]			1.60808	14.9° [39]	
	88	14 [36]			1.59317	$n_{H\alpha}^{20}$ [35]	
	93–95	12 [10]			1.59978	$n_{H\alpha}^{16.2}$ [7]	
	85–86	12 [27]			1.60345	$n_{H\alpha}^{16}$ [22,39]	
	86(a)	11 [31]			1.59736	$n_{H\alpha}^{14.9}$ [39]	
	83–84	11 [18]			1.62952	$n_{H\beta}^{20}$ [35]	
	76(b)	11 [31]			1.63410	$n_{H\beta}^{16.2}$ [7]	
	90(a)	10 [37]			1.64232	$n_{H\beta}^{16}$ [22,39]	
	50–51	0.4 [18]			1.63707	$n_{H\beta}^{14.9}$ [39]	
					1.65044	$n_{H\gamma}^{20}$ [35]	
					1.67190	$n_{H\gamma}^{16}$ [22,39]	
					1.66514	$n_{H\gamma}^{14.9}$ [39]	

(a) This constant was determined on the *cis* form.
(b) This constant was determined on the *trans* form.

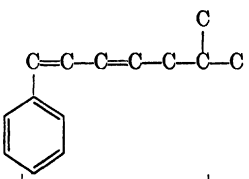
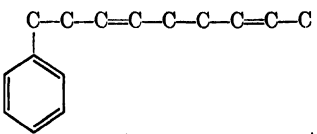
2-Phenylbutadiene-1,3 							
	60–61	17 [5]	0.9226 [5]		1.5489 [5]		
	58–59	9 [3]					

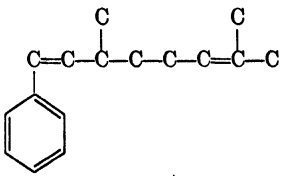
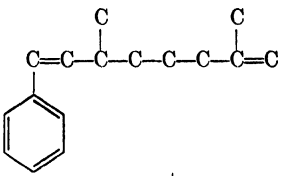
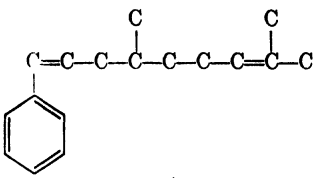
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenylbutadiene-2,3 				
	72–73 17 [5]	0.9220 [5]	1.5460 [5]	
$C_{11}H_{12}$				
1-Phenylpentadiene-1,3 				
−4 [22]	116 16 [22,32] 112–114.5 15 [39] 110 13 [4]	0.9325 15.2° [39] 0.9384 13° [22]	1.59997 15.2° [39] 1.61114 13° [22] 1.58987 $n_{H\alpha}^{15.2}$ [39] 1.60167 $n_{H\alpha}^{13}$ [22] 1.62739 $n_{H\beta}^{15.2}$ [39] 1.64065 $n_{H\beta}^{13}$ [22] 1.66056 $n_{H\gamma}^{15.2}$ [39] 1.67038 $n_{H\gamma}^{13}$ [22]	
3-Phenylpentadiene-1,3 				
	85–86 15 [26]	0.915 21° [26]	1.5500 21° [26]	
5-Phenylpentadiene-1,2 				
	76–77 7 [5]	0.9169 [5]	1.5400 [5]	
1-Phenyl-3-methylbutadiene-1,3 				
37 [25]	124 32 [19] 115 18 [15,16]	0.9423 23° [19]		

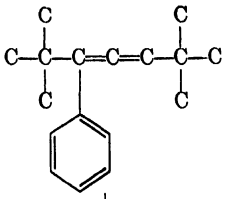
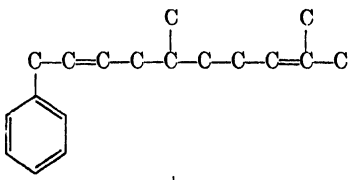
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Phenyl-3-methylbutadiene-1,3 				
	95 24 [8]			
$C_{12}H_{14}$				
1-Phenylhexadiene-1,3 				
	128 16 [22]	0.9189 [22] 0.9253 12° [22]	1.60252 12° [22] 1.59164 $n_{H\alpha}^{12}$ [22] 1.62999 $n_{H\beta}^{12}$ [22] 1.65874 $n_{H\gamma}^{12}$ [22]	
6-Phenylhexadiene-1,3 				
	99.5 −100.5 11 [6]	0.9304 13° [6]	1.5446 13° [6]	
1-Phenyl-3-methylpentadiene-1,3 				
	132–133 21 [19] 130 20 [21]	0.9523 23° [19] 0.9593 19° [21]	1.5366 19° [21]	

M. P.,°C	B. P.,°C @ 760mm	D_t^{20}	n_D^{20}	Additional Data
1-Phenyl-4-methylpentadiene-1,3 	123–124 14 [39]	0.9512 16.2° [39]	1.54744 16.2° [39] 1.54090 $n_{H\alpha}^{16.2}$ [39] 1.56509 $n_{H\beta}^{16.2}$ [39] 1.59232 $n_{H\gamma}^{16.2}$ [39]	
2-Phenyl-4-methylpentadiene-1,3 	77–80 10 [33]	0.9235 [33]	1.547 [33]	
2-Methyl-4-phenylpentadiene-2,3 	218–220 751 [20] 107–108 20 [20]	0.922 D_{20}^{20} [29] 0.9277 19.8° [20]	1.5236 [20]	
1-Phenyl-2-ethylbutadiene-1,3 	110–111 14 [9]	0.9288 19° [9]	1.576 [9]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-2,3-dimethylbutadiene-1,3	165 30 [24]			
$C_{13}H_{16}$ 2-Phenylheptadiene-1,3	246–248 [17]	0.9384 15° [17]	1.5422 14° [17]	
1-Phenyl-5-methylhexadiene-1,3	143 22 [22,39] 136 16 [22,39]	0.9248 [22,39]	1.58727 [22,39] 1.57822 $n_{H\alpha}^{20}$ [22,39] 1.61401 $n_{H\beta}^{20}$ [22,39] 1.64065 $n_{H\gamma}^{20}$ [22,39]	
1-Phenyl-3-methylhexadiene-3,5	116 12 [6]	0.9152 13.3° [6]	1.5321 13.3° [6]	
1-Phenyl-2,4-dimethylpentadiene-1,3	234–236 730 [40]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4-*m*-Xylylpentadiene-1,3 (a)				
	230–233[30] 120–121 21.5[30]	0.9097 21°[30]	1.53233 21°[30]	
(a) The position of the methyl groups in Xylene is not given.				
4-*p*-Xylylpentadiene-1,3 (a)				
	117.5 20[30]	0.9062 21°[30]	1.53690 21°[30]	
(a) The position of the methyl groups in Xylene is not given.				
$C_{14}H_{18}$				
1-Phenyl-6-methylheptadiene-1,3 				
	142–144 15.5[39] 146–147 15[22]	0.9508[22] 0.9486 14.9°[39]	1.58547[22] 1.58232 14.9°[39] 1.57652 $n_{H\alpha}^{20}$[22] 1.57364 $n_{H\alpha}^{14.9}$[39] 1.61105 $n_{H\beta}^{20}$[22] 1.60620 $n_{H\beta}^{14.9}$[39] 1.63249 $n_{H\gamma}^{20}$[22] 1.63025 $n_{H\gamma}^{14.9}$[39]	
2-Methyl-6-phenylheptadiene (a)				
	140–142 22[12]	0.9205 10°[12]	1.53449 13°[12] 1.53619 10°[12]	
(a) The position of the double bonds is not given.				
$C_{15}H_{20}$				
1-Phenylnonadiene-3,7 				
	140–142 16[2]	0.889 D_{21}^{21}[2]	1.5105 21°[2]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Methyl-6-benzylheptadiene (a)				
	136–138 12 [12] 101–104 4 [12]	0.9289 11° [12]	1.53245 11° [12]	
(a) The position of the double bonds is not given.				
$C_{16}H_{22}$				
1-Phenyl-3,7-dimethyloctadiene-1,6 	151–152 9 [34]	0.8957 [34]	1.52849 [34]	$[\alpha]_D^{20} = -63.24°$ [34]
1-Phenyl-3,7-dimethyloctadiene-1,7 	152 9.5 [23,38]	0.8947 17° [23,38]	1.5276 17° [23,38]	$[\alpha]_D^{17} = -65.11°$ [23]
$C_{17}H_{24}$				
1-Phenyl-4,8-dimethylnonadiene-1,7 	159–160 9 [34]	0.8894 [34]	1.51765(a) [34] 1.51340(a) $n_{H\alpha}^{20}$ [34] 1.52939(a) $n_{H\beta}^{20}$ [34] 1.53964 $n_{H\gamma}^{20}$ [34]	$[\alpha]_D^{20} = -3.33°$ [34]
(a) This value is an average of two or more determinations				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2,6,6-Tetramethyl-3-phenylheptadiene-3,4 				
	78–80 1 [14]	0.8808 [14]	1.5039 [14]	
$C_{18}H_{26}$				
1-Phenyl-5,9-dimethyldecadiene-2,8 				
	163–164 9 [34]	0.8852 [34] 0.8851 [34]	1.50766 [34] 1.50375 $n_{H\alpha}^{20}$ [34] 1.51768 $n_{H\beta}^{20}$ [34] 1.52629 $n_{H\gamma}^{20}$ [34]	$[\alpha]_D^{20}$ = −5.76° [3]

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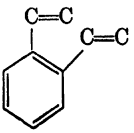
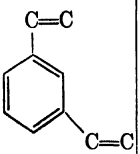
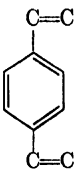
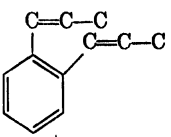
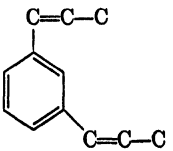
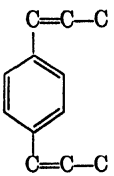
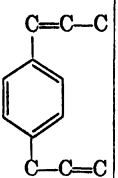
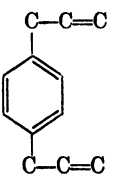
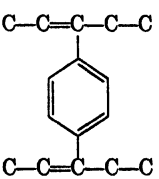
40. von Fellenberg, T., Ber. **39**, 2064 1906.

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1,2-Diethenylbenzene 							
	73–74	12 [5]	0.9325	22° [5]	1.57594	22° [5]	
	78.5	11 [4]	0.934	21° [3,4]	1.5760	21° [3,4]	
	73.5	11 [3]			1.56827	$n_{H\alpha}^{22}$ [5]	
					1.59630	$n_{H\beta}^{22}$ [5]	
1,3-Diethenylbenzene 							
	52	3 [3,4]	0.926	22° [3,4]	1.5745	22° [3]	
					1.5746	22° [4]	
1,4-Diethenylbenzene 							
31 [3,7]	ca.180 [6]		0.913	40° [3,7]	1.5820	40° [3,7]	
28–29 [9]	85–86	16 [9]					
	52	4 [7]					
	52	3 [3]					
$C_{12}H_{14}$							
1,2-Di-(propen-1′-yl)-benzene 							
−26 [3]	108.5–109	9 [3]	0.9263	21° [3]	1.5752	21° [3]	
	108–108.5	9 [3]	0.9185	20.5° [3]	1.5760	20.5° [3]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3-Di-(propen-1′-yl)-benzene 	117–120 14[3]	0.9221 24°[3]	1.5780 24°[3]	
1,4-Di-(propen-1′-yl)-benzene 	123–125 12[8]			
63.6–64[1] 63–64[8] 63[3]				
1-(Propen-1′-yl)-4-(propen-2′-yl)-benzene 	107–108 11[8]	0.918 11°[8]	1.559 11°[8]	
1,4-Di-(propen-2′-yl)-benzene 	94 12[8]	0.915 11°[8]	1.526 11°[8]	
$C_{16}H_{22}$ 1,4-Di-(3′-penten-2′-yl)-benzene 	149–151 20[2]			

References on Benzene with Two Alkenyl Substitutions

1. Bogert, M. T., and C. P. Harris, J. Am. Chem. Soc. **41**, 1676 1919.
2. Bogert, M. T., and P. S. Nisson, Proc. Natl. Acad. Sci. U.S. **10**, 426 1924.
3. Deluchat, R., Ann. chim. [11] **1**, 181 1934.
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5. Fries, K., and H. Bestian, Ber. **69**, 715 1936.
6. Ingle, H., Ber. **27**, 2526 1894.
7. Lespieau and Deluchat, Compt. rend. **190**, 683 1930.
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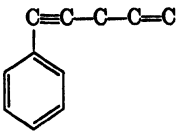
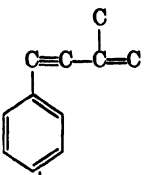
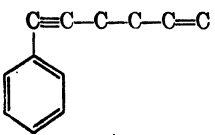
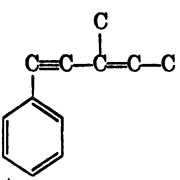
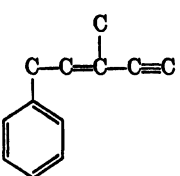
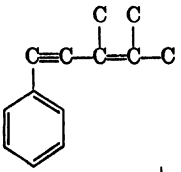
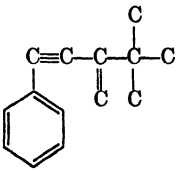
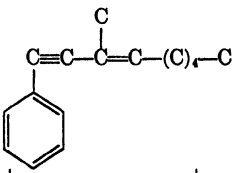
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenylpenten-4-yne-1 	103–105 20[5]	0.940 D_{15}^{15}[5]	1.558 18°[5]	
1-Phenyl-3-methylbuten-3-yne-1 	88 7[10]			
$C_{12}H_{12}$				
1-Phenylhexen-5-yne-1 	103–105 20[4]	0.94[4]	1.558[4]	
1-Phenyl-3-methylpenten-3-yne-1 	113–115 15[3,7] 102–103 9[1]	0.9305 D_{20}^{20}[1] 0.93 13°[3] 0.9301 13°[7] 0.9452 0°[3] 0.9462 D_0^0[1]	1.5828 13°[3] 1.58281 13°[7] 1.57675 $n_{H\alpha}^{13}$[7] 1.6046 $n_{H\beta}^{13}$[7] 1.61954 $n_{H\gamma}^{13}$[7]	
1-Phenyl-3-methylpenten-2-yne-4 	98 10[9]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-3,4-dimethylpenten-3-yne-1 	120–122 12 [2]			
$C_{14}H_{16}$ 1-Phenyl-3-methylene-4,4-dimethylpentyne-1 	115–116 10 [8]			
$C_{16}H_{20}$ 1-Phenyl-3-methylnonen-3-yne-1 	141–142 5 [6]	0.9006 D_{20}^{20} [6] 0.9137 D_0^0 [6]	1.5468 19° [6]	

References on Benzene with One Alkenynyl Substitution

1. Bork, J., J. Russ. Phys. Chem. Soc. **37**, 647 1905; Chem. Zentr. **1905**, II, 1019.
2. Bork, J., J. Russ. Phys. Chem. Soc. **37**, 650 1905; Chem. Zentr. **1905**, II, 1019.
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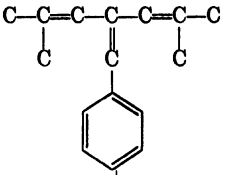
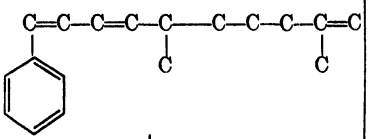
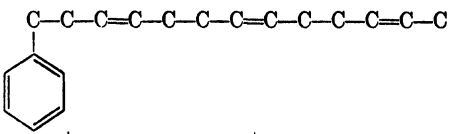
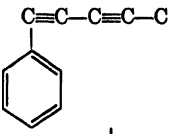
10. Skosarevskiĭ, M., J. Russ. Phys. Chem. Soc. **37**, 645 1905; Chem. Zentr. **1905**, II, 1018.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,6-Dimethyl-4-benzylideneheptadiene-2,5 	277–278 724 [3]			
$C_{18}H_{24}$				
1-Phenyl-5,9-dimethyldecatriene-1,3,9 	170–173 10 [2] 95 ca. 0.05 [2]	0.9273 [2]		$[\alpha]_D^{20}$ = +52.85° [2]
$C_{19}H_{26}$				
1-Phenyltridecatriene-3,7,11 	188–191 16 [1]	0.898 D_{21}^{21} [1]	1.5125 21° [1]	

References on Benzene with One Alkatrienyl Substitution

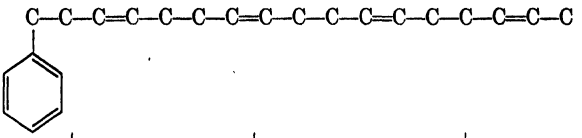
1. Arbusov, B. A., and E. V. Kuznetsov, Compt. rend. acad. sci. U.R.S.S. **39**, 343 1943; Survey For. Petrol. Liter., Feb. 25, 1944.
2. Rupe, H., and R. Rinderknecht, Ann. **442**, 61 1925.
3. von Fellenberg, T., Ber. **39**, 2064 1906.

9. BENZENE WITH ONE ALKADIYNYL SUBSTITUTION, C_nH_{2n-14}

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1-Phenylpentadiyne-1,3 							
22.45[1]	129	20[1]	0.9745	21°[2]	1.6368	21°[2]	
22.3[2]			0.9745	18°[1]	1.6368	18°[1]	

References on Benzene with One Alkadiynyl Substitution

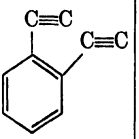
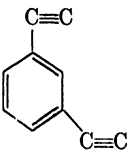
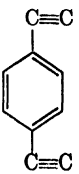
1. Prevost, C., Ann. chim. [10] 10, 356 1928.
2. Prevost, C., Compt. rend. 180, 1851 1925.

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenylheptadecatetraene-3,7,11,15 				
	210–220 16 [1]	0.920 D_{21}^{21} [1]	1.5135 21° [1]	

References on Benzene with One Alkatetraenyl Substitution

1. Arbusov, B. A., and E. V. Kuznetsov, Compt. rend. acad. sci. U.R.S.S. **39**, 343 **1943**; Survey For. Petrol. Liter., Feb. 25, **1944**.

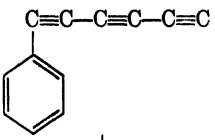
11. BENZENE WITH TWO ALKYNYL SUBSTITUTIONS, C_nH_{2n-14}

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1,2-Diethynylbenzene 	82	14 [1,2]	0.9788	17.5° [1,2]	1.5915	17.5° [1,2]	
1,3-Diethynylbenzene 							
−2.5 [1,2]	78	15 [1,2]	0.9669	18° [1,2]	1.5841	18° [1,2]	
1,4-Diethynylbenzene 							
95 [1,3]							

References on Benzene with Two Alkynyl Substitutions

1. Deluchat, R., Ann. chim. [11] **1**, 181 1934.
2. Deluchat, Compt. rend. **192**, 1387 1931.
3. Lespieau and Deluchat, Compt. rend. **190**, 683 1930.

12. BENZENE WITH ONE ALKATRIYNYL SUBSTITUTION, C_nH_{2n-18}

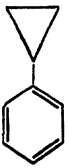
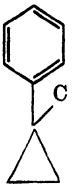
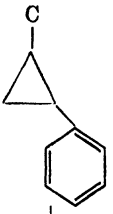
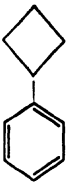
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenylhexatriyne-1,3,5 	52 18[1]			

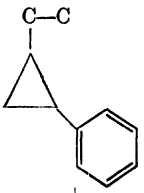
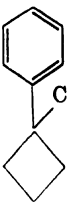
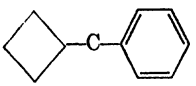
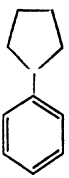
References on Benzene with One Alkatriynyl Substitution

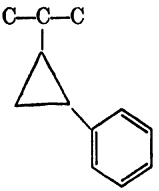
1. Grignard, V., and Tchéoufaki, Compt. rend. **188**, 357 1929.

III. BENZENE WITH ALICYCLIC SUBSTITUTIONS

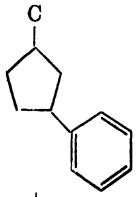
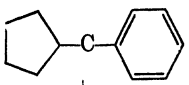
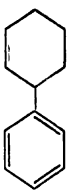
1. Benzene with One Cyclyl Substitution C_nH_{2n-8}
2. Benzene with One Cyclenyl, One Cyclylidenyl, or One Cyclylalkenyl Substitution C_nH_{2n-10}
3. Benzene with One Bicyclyl Substitution C_nH_{2n-10}
4. Benzene with Two Cyclyl Substitutions C_nH_{2n-10}
5. Benzene with One Cyclodienyl, One Alkenylcyclenyl, or One Dialkenylcyclyl Substitution C_nH_{2n-12}
6. Benzene with One Bicyclenyl, One Alkenylbicyclyl, or One Bicyclylidene Substitution C_nH_{2n-12}
7. Benzene with One Tricyclyl Substitution C_nH_{2n-12}
8. Benzene with One Cyclyl and One Cyclenyl or Cyclylidene Substitution C_nH_{2n-12}
9. Benzene with Three Cyclyl Substitutions C_nH_{2n-12}
10. Benzene with One Cyclenylalkynyl Substitution C_nH_{2n-14}
11. Benzene with One Alkenylcyclodienyl Substitution C_nH_{2n-14}
12. Benzene with One Bicyclenylalkenyl Substitution C_nH_{2n-14}
13. Benzene with Two Cyclenyl Substitutions C_nH_{2n-14}
14. Benzene with Four Cyclyl Substitutions C_nH_{2n-14}
15. Benzene with One Bicyclenylalkynyl Substitution C_nH_{2n-16}
16. Benzene with Two Cyclylcyclenyl Substitutions C_nH_{2n-16}
17. Benzene with One Bicyclylpentaenyl Substitution C_nH_{2n-20}

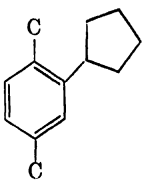
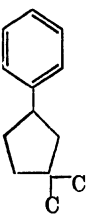
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclopropylbenzene 				
−31 [33]	170.5 [33,34] 171 771 [7] 173.6 758 [29] 60–61 13 [33,34]	0.9397 [34] 0.9397 24° [33] 0.9401 D_0^{20} [29] 0.9449 D_0^{15} [29]	1.5285 [7] 1.5291 [34] 1.5312 24° [33] 1.5342 15° [29]	
$C_{10}H_{12}$				
1-Methyl-1-phenylcyclopropane 				
	91 50 [64]		1.5160 [64] 1.5150 20.4° [64]	
1-Methyl-2-phenylcyclopropane 				
	184–186 [10] 186 743 [28A]	0.925 [10] 0.9198 D_0^{20} [28A]	1.5208 [28A] 1.5237 [10]	
Cyclobutylbenzene 				
	190–191 755 [7]	0.9378 [7]	1.5277 [7]	

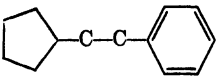
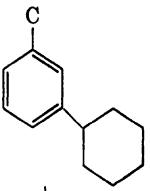
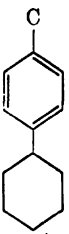
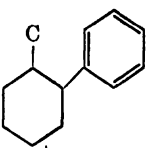
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Ethyl-2-phenylcyclopropane 				
	203–205 [10]	0.918 [10] 0.948 17° [5]	1.5162 [10] 1.5276 17° [5]	
1-Methyl-1-phenylcyclobutane 				
	208.6 [26] 69 8 [26]	0.9192 [26] 0.9044 40° [26]	1.5132 [26]	
Cyclobutylphenylmethane 				
		0.9556 [24]	1.5265 [24]	
Cyclopentylbenzene 				*
	216.4	0.9476		
	219.5–220.5 [19]	0.9462 [19]	1.5280 [19,68]	
	217 [68]	0.9470 [18]	1.5309 [7]	
	215–217 [67]	0.9471 [17]	1.531 [45]	
	215 [63]	0.9474 [68]	1.52867 25° [2]	
	214–215 [2]	0.9499 [7]	1.5330 23° [63]	
	213–215 [5,62]	0.9504 [45]	1.5295 19° [11,15]	
	215–218 755 [8]	0.8838 100° [19]	1.5305 19° [67]	
	216 755 [7]	0.9228 50° [19]	1.5320 17° [5]	
	216–218 750 [11,15]	0.94319 25° [2]	1.5301 15° [19]	
	215–216 750 [45]	0.9503 19° [67]		

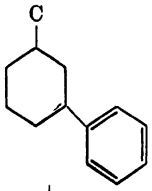
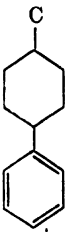
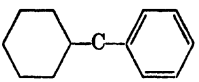
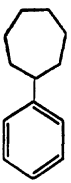
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclopentylbenzene (*Continued*)		0.9509 19° [11,15] 0.9618 0° [19] 0.9619 0° [17]	1.52461 $n_{H\alpha}^{25}$ [2] 1.53940 $n_{H\beta}^{25}$ [2]	
	102–102.6 18 [17] 102.0–102.5 18 [18]			
* $\frac{dD}{dt}$ = −0.0008362/°C (0 to 100°C)				
$C_{12}H_{16}$				
1-Isopropyl-2-phenylcyclopropane 				
	213–216 [10]	0.899 [10]	1.5072 [10]	
1-Phenyl-3,3-dimethylcyclobutane				
	208 [49]		1.5101 25° [49]	
Methylcyclopentylbenzene (a)				
	237.5 757 [48]	0.9401 [48]	1.5287 [48]	

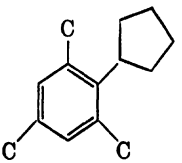
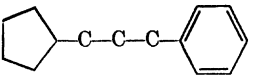
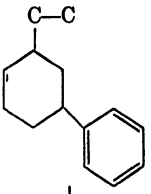
(a) The structure of this compound is not given.

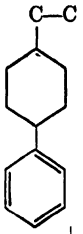
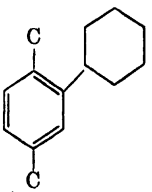
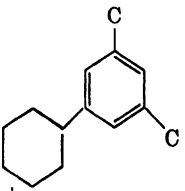
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-3-phenylcyclopentane 				
	230–235 [5]	0.9173 17° [63]	1.5136 17° [63]	
	230–232 [22]	0.950 17° [5]	1.5276 17° [5]	
	93–94 12 [63]	0.937 16° [22]	1.5210 16° [22]	
Cyclopentylphenylmethane 				
	233–235 [68]	0.9418 [24]	1.5245 [24]	
	232–234 [68]	0.9283 21° [12,15]	1.5170 21° [12,15]	
	234–236 750 [12,15]	0.9345 18° [68]	1.5206 18° [68]	
			1.5221 17° [68]	
Cyclohexylbenzene 				
6.9	**238.1**	**0.9431**	**1.5249**	
7–8 [40,55]	242 [30]	0.9428 [19]	1.5234 [27]	
7 [21,31,57]	239.0 ± 0.6 [19]	0.9436 [44]	1.5237 [58]	
6.6–7.0 [9]	239 [50,51,53]	0.944 [9]	1.5254 [9]	
6.5 [6]	236–238 [41]	0.8775 100° [19]	1.5255 [44]	
6 [44]	237.5 [23]	0.9183 50° [19]	1.5260 [19]	
	235–236 [40]	0.9338 25° [39]	1.526 [23]	
	234–236 [28]	0.9339 25° [37]	1.5225 25° [37]	
	235 [39]	0.9431 25° [28]	1.527 18° [57]	
	238 770 [20]	0.9405 22° [27]	1.5274 18° [21]	
	238 761 [27]	0.9454 D_{20}^{20} [58]	1.528 16° [3]	
	238 759 [7]	0.948 D_{20}^{20} [36]	1.5288 15° [19]	
	238.6 –238.8 756 [9]	0.9441 D_0^{20} [31]		
	233–234 755 [6]	0.947 16° [3]		
	239 750 [21]	0.947 15° [23]		
	236–237 746 [44]	0.9591 0° [19]		
	239 745 [31]			
	238–240 743 [3]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclohexylbenzene (*Continued*)				
	234–235 737 [55]			
	232–235 715 [58]			
	230–233 710 [66]			
	156 80 [20]			
	132 30 [38]			
	115 15 [38]			
	110–115 14 [61]			
	107 13 [47]			
	107–108 12.5 [27]			
	106–107 12 [30]			
	106 12 [20]			
	105–106 10 [65]			
	92 5 [37]			
	76–78 2 [43]			
	12.4 0.017 [35]			
* $\frac{1}{T_b} = 0.0029920 - 0.0003460 \log_{10} p_{mm}$ (2 to 80 mm)				
† $\frac{dD}{dt} = -0.0008201/°C$ (0 to 100°C)				
‡ $\frac{dn}{dt} = -0.0006400/°C$ (15 to 25°C)				
$C_{12}H_{18}$				
1,4-Dimethyl-2-cyclopentylbenzene 				
−44 [43]	254.5–255 762 [43]	0.9414 [43]	1.5291 [43]	
1-Phenyl-3,3-dimethylcyclopentane 				
	242 [49]		1.5269 25° [49]	

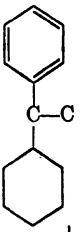
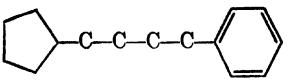
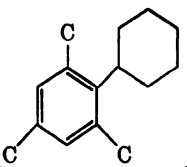
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Cyclopentyl-2-phenylethane 				
	255–256 752.5 [13] 254–256 752 [13] 254–255 751.5 [14,15]	0.9276 19° [14,15] 0.9401 19° [13]	1.5210 [13] 1.5150 19° [14,15] 1.5225 19° [13]	
1-Methyl-3-cyclohexylbenzene 				
	257–257.3 754 [32]	0.9365 18° [32]	1.5236 18° [32]	
1-Methyl-4-cyclohexylbenzene 				
	259.8–260 750 [32]	0.9351 D_0^{20} [32] 0.9365 18° [32] 0.9494 D_0^{0} [32]	1.5232 18° [32]	
1-Methyl-2-phenylcyclohexane 				
	91–92 2 [54]	0.9569 18.5° [54]	1.5360 18.5° [54]	

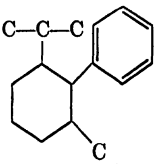
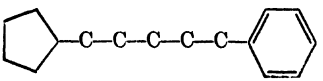
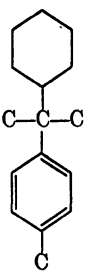
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-3-phenylcyclohexane 	249 730 [32] 123–124 14 [60]	0.9304 23° [60] 0.9426 D_{20}^{20} [32] 0.9412 D_0^{20} [32] 0.9425 18° [32] 0.9556 D_0^{0} [32]	1.5176 26° [60] 1.5246 18° [32]	$[\alpha]_D^{20}$ = −5.26° [60]
1-Methyl-4-phenylcyclohexane 	130 21 [47A]	0.9442 [47A]	1.5210 [47A]	
Cyclohexylphenylmethane 	239.5–241.5 736 [24] 137 20 [54]	0.9281 [24] 0.9436 17° [54]	1.5132 [24] 1.5255 17° [54]	
Cycloheptylbenzene 	132–135 28 [54] 131–132 16 [56] 108 7 [47A]	0.9482 [47A] 0.9410 23° [54]	1.5309 [47A] 1.5217 23° [54]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Isopropylcyclopentylbenzene (a)				
	266.5 -267.5 757 [48]	0.9222 [48]	1.5190 [48]	
(a) The structure of this compound is not given.				
1,3,5-Trimethyl-2-cyclopentylbenzene 				
	276– 276.5 767 [48]	0.9435 [48]	1.5325 [48]	
1-Cyclopentyl-3-phenylpropane 				
	271– 272.5 743 [13,15]	0.9233 19° [13,15]	1.5130 19° [13,15]	
Methylcyclohexyltoluene (a)				
	257-262 [42]	0.9615 D_{20}^{20} [42]	1.5095 [42]	
(a) The structure of this compound is not given.				
1-Ethyl-3-phenylcyclohexane 				
	103-107 3 [43]			

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Ethyl-4-phenylcyclohexane 	264–265 [46] 144–147 16 [46]	0.9328 [46]	1.52129 [46]	
1,4-Dimethyl-2-cyclohexylbenzene 	261–262 [4] 262–263 759 [3]	0.936 18° [3,4]	1.529 18° [3,4]	
1,3-Dimethyl-5-cyclohexylbenzene 	266–268 763 [3,4] 265–266 748 [1] 142–143 17 [1]	0.931 18° [3,4]	1.525 18° [3,4]	
Methylphenylcyclohexylmethane (a)	132–133 18 [59]	0.9503 [59] 0.9517 D_{20}^{20} [59] 0.9624 D_0^0 [59]	1.53406 [59]	

(a) The structure of this compound is not given.

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-1-cyclohexylethane 	264–266 [52]	0.9773 17° [52]	1.549 17° [52]	
$C_{15}H_{22}$ 1-Methyl-4-isopropylcyclopentylbenzene (a)	121–122 6.5 [48]	0.9227 [48]	1.5219 [48]	
(a) The position of the cyclopentyl group is not given.				
1-Cyclopentyl-4-phenylbutane 	289–290 754 [15]	0.9237 [15]	1.5140 [15]	
Isopropylcyclohexylbenzene (a)	275–280 [25]		1.5170 [25]	
(a) The structure of this compound is not given.				
1,3,5-Trimethyl-2-cyclohexylbenzene 	283–284.5 740 [3,4]	0.946 9° [3,4]	1.535 9° [3,4]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Isopropyl-2-phenyl-3-methylcyclohexane 				
	275 [27] 143–144 14 [27]	0.934 23° [27]	1.51830 [27] 1.5205 17° [27]	$[\alpha]_D^{17}$ = −3.898° [27]
1-Cyclopentyl-5-phenylpentane 				
	304–305 758 [15,16]	0.9181 [15,16]	1.5110 [15,16]	
2-Cyclohexyl-2-*p*-tolylpropane 				
	279–283 739 [4]	0.916 24° [4]	1.517 24° [4]	
$C_{17}H_{26}$ Cyclopentylphenylhexane (a)				
	315–317 749 [16]	0.9187 [16]	1.5128 [16]	

(a) The structure of this compound is not given.

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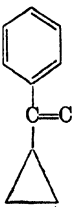
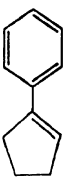
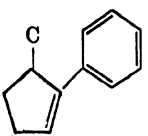
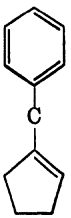
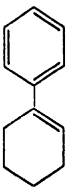
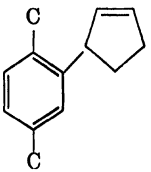
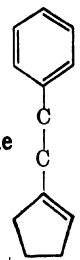
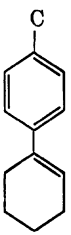
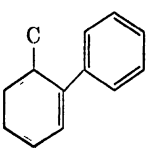
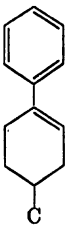
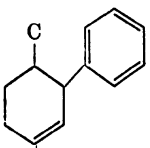
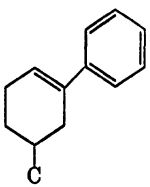
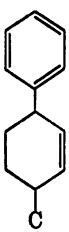
2. BENZENE WITH ONE CYCLENYL, ONE CYCLYLIDENYL, OR ONE CYCLYLALKENYL SUBSTITUTION, C_nH_{2n-10}

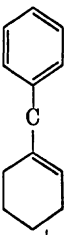
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclobutenylbenzene (a)				
25 [14,15]	118–122 12 [14] 120–122 10 [15]			
(a) The position of the double bond in cyclobutene is not given.				
$C_{11}H_{12}$				
1-Phenyl-1-cyclopropylethene 	211–213 758 [23]	0.9553 D_0^{19} [23]		
Cyclopenten-1-ylbenzene 				
23 [2,5,16] 22–23 [40]	230 [2] 124.5–125.5 30 [40] 118–119 30 [21] 120–121 20 [2] 109 14 [2,16] 92–93 13 [55] 95.3 6 [16]	0.98617 25° [5] 0.9862 25° [2] 0.9875 23° [40] 0.9668 19° [55]	1.57340 25° [2,5] 1.5750 23° [40] 1.5396 19° [55] 1.56723 $n_{H\alpha}^{25}$ [2,5] 1.59017 $n_{H\beta}^{25}$ [2,5]	
$C_{12}H_{14}$				
1-Methyl-2-phenylcyclopentene-2 	116–117 20 [2,4,21]			

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
Cyclopenten-1-ylphenylmethane 							
	113–117	18 [40,41]	0.952	23° [41]	1.5415 [40,41]		
	109–111	15 [41]	0.9580	22° [40]	1.5355	23° [41]	
	120–122	10 [10,12]	0.958	22° [41]	1.5510	17.5° [19,12]	
			0.9773	17.5° [10,12]			
Cyclohexen-1-ylbenzene 							*
			0.9908_5		1.5692_5		
−11 [22]	250 [3]		0.9931 [54]		1.5690 [53]		
	244.8 [7]		0.98712	25.15° [3]	1.5694 [53]		
	241–243 [48,49]		0.9930	14.9° [53]	1.57179 [54]		
	132	26 [54]	0.9932	14.7° [53]	1.56692	25.15° [3]	†
	133	20 [18,30,35,46]	0.994	14° [46]	1.569	17° [35]	
			1.008	0° [35]	1.57180	14.7° [53]	
	128–132	20 [21]	1.004	D_0^0 [46]	1.57157	14.2° [53]	
	131	20 [3]			1.56131	$n_{H\alpha}^{25.15}$ [3]	
	133	17 [53]			1.56636	$n_{H\alpha}^{14.7}$ [53]	
	126–127	15 [53]			1.56612	$n_{H\alpha}^{14.2}$ [53]	
	125–126	14 [22]			1.58141	$n_{H\beta}^{25.15}$ [3]	
	124–126	14 [39]			1.58725	$n_{H\beta}^{14.7}$ [53]	
* $\frac{dD}{dt} = -0.0007261$/°C (0 to 25°C)					1.58679	$n_{H\beta}^{14.2}$ [53]	
† $\frac{dn}{dt} = -0.0004383$/°C (14 to 25°C)					1.60093	$n_{H\gamma}^{14.7}$ [53]	
					1.60026	$n_{H\gamma}^{14.2}$ [53]	
Cyclohexenylbenzene (a)							
	243.2–244.2 [52]		0.9793 [52]		1.5528 [52]		

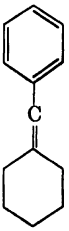
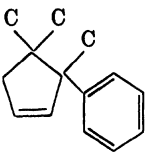
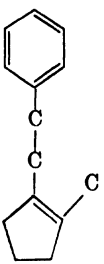
(a) The double bond is in either the 2 or 3 position.

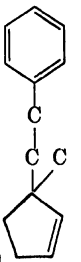
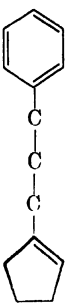
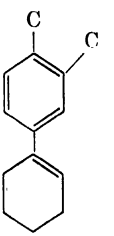
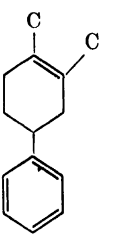
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Dimethyl-2-(cyclopenten-2′-yl)-benzene 	125–127 14 [56]	0.9613 23° [56]	1.5380 23° [56]	
1-(Cyclopenten-1′-yl)-2-phenylethane 	124–125 10 [11]	0.9527 20.5° [11]	1.5330 20.5° [11]	
1-Methyl-4-(cyclohexen-1′-yl)-benzene 	142 20 [46]	0.971 12° [46] 0.981 D_0^0 [46]		
1-Methyl-2-phenylcyclohexene-2 	128 6 [37]			

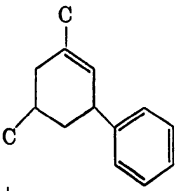
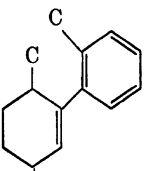
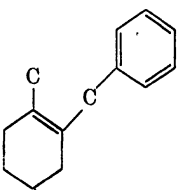
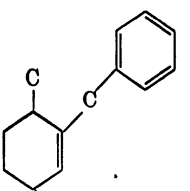
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-4-methylcyclohexene-1 	147 23 [35,46,47]	0.9716 14° [46,47] 0.9846 0° [46,47]	1.536 17° [35] 1.555 14° [47]	
1-Methyl-2-phenylcyclohexene-3 	110–113 12 [33]			
2-Phenyl-4-methylcyclohexene-1 	145 20 [36]	0.9702 [36] 0.9859 0° [36]	1.555 [36]	
1-Phenyl-4-methylcyclohexene-2 	132 15–16 [30]			

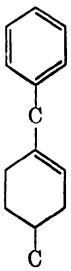
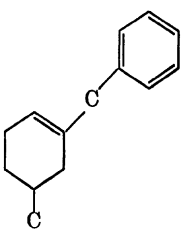
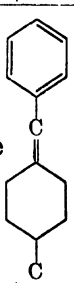
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-3-phenylcyclohexene (a)				
	248–252 [25]	0.9581 22° [25]	1.5402 22° [25]	
	146–150 32 [25]			
	128–130 17 [25]			
(a) The double bond is in either the 4 or 5 position.				
Phenylcyclohexen-1-ylmethane 				*
		0.9632		
	139–141 22 [53]	0.9634 [27,29]	1.5400 [27,29]	
	132–133 19 [53]	0.964 [18]	1.5407 [18]	
	133–134 15 [53]	0.9656 14.3° [53]	1.5416 [53]	
	127.2–128.4 15 [27,29]	0.9663 13.7° [53]	1.5437 [53]	
		0.9678 13.4° [53]	1.5449 [53]	
	133 14 [18]	0.9680 13.2° [53]	1.5453 [53]	
	125 13 [53]	0.9802 0° [51]	1.54774 14.6° [53]	
	125 11.5 [53]		1.54426 14.1° [53]	
			1.54651 13.7° [53]	
			1.54769 13.2° [53]	
			1.54327 $n_{H\alpha}^{14.6}$ [53]	
			1.54009 $n_{H\alpha}^{14.1}$ [53]	
			1.54202 $n_{H\alpha}^{13.7}$ [53]	
			1.54303 $n_{H\alpha}^{13.2}$ [53]	
			1.56043 $n_{H\beta}^{14.6}$ [53]	
			1.55601 $n_{H\beta}^{14.1}$ [53]	
			1.55879 $n_{H\beta}^{13.7}$ [53]	
			1.55994 $n_{H\beta}^{13.2}$ [53]	
			1.57093 $n_{H\gamma}^{14.6}$ [53]	
			1.56577 $n_{H\gamma}^{14.1}$ [53]	
			1.56939 $n_{H\gamma}^{13.7}$ [53]	
			1.57070 $n_{H\gamma}^{13.2}$ [53]	

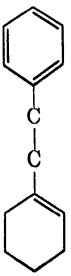
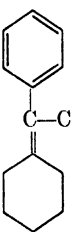
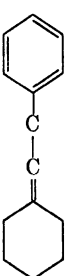
* $\frac{dD}{dt} = -0.0007737$/°C (0 to 20°C)

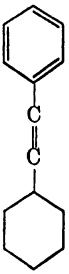
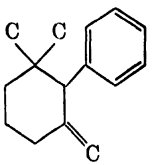
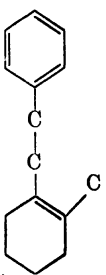
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Benzylidenecyclohexane 				
−36−−38 [42]	122–123 11 [44] 117–118.5 10 [27] 117–118 10 [28] 116 9 [42]	0.9579 [27,28] 0.9663 23° [42] 0.9640 17° [44]	1.5437 [27,28] 1.55674 23° [42] 1.53950 17° [44]	
$C_{14}H_{18}$				
1,1,2-Trimethyl-2-phenylcyclopentene-3 				
	195–200 40 [6]			
1-Phenethyl-2-methylcyclopentene-1 				
	143–144 22 [26]	0.93747 20.3° [26] 0.93644 18.5° [26]	1.52391 20.3° [26] 1.52523 18.5° [26]	

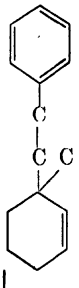
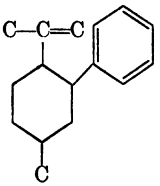
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-1-phenethylcyclopentene-2 	142 23 [26]	0.93055 16.3° [26]	1.52148 16.3° [26]	
1-(Cyclopenten-1′-yl)-3-phenylpropane 	117–118 3 [11]	0.9471 18.5° [11]	1.5330 18.5° [11]	
1,2-Dimethyl-4-(cyclohexen-1′-yl)-benzene 	277–278 [20] 167–169 5–6 [20]			
1,2-Dimethyl-4-phenylcyclohexene-1 	128–130 11 [1]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,5-Dimethyl-3-phenylcyclohexene-1 	141–143 23 [53] 131 14 [34]	0.942 [53] 0.9460 15.5° [53] 0.9462 15.3° [53]	1.5431 [53] 1.53617 15.3° [53] 1.53131 $n_{H\alpha}^{15.3}$ [53] 1.54773 $n_{H\beta}^{15.3}$ [53] 1.55799 $n_{H\gamma}^{15.3}$ [53]	
1-Methyl-2-*o*-tolylcyclohexene-2 	158–160 12 [37]	0.961 [37] 0.985 0° [37]	1.541 [37]	
1-Methyl-2-benzylcyclohexene-1 	158–160 19 [9]	0.9938 17.8° [9]	1.5445 17.8° [9]	
1-Methyl-2-benzylcyclohexene-2 	170 42 [37]	0.981 18° [37] 0.99 0° [37]	1.453 18° [37]	

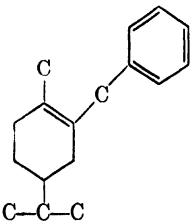
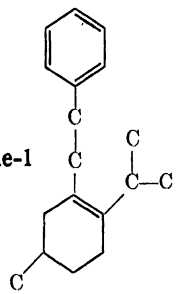
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Benzyl-4-methylcyclohexene-1 	160 30 [47] 133 15 [50]	0.9567 16° [47] 0.9687 0° [47]	1.542 16° [47]	
2-Benzyl-4-methylcyclohexene-1 	271 [36] 156 20 [36]	0.9591 [36] 0.9693 0° [36]	1.547 [36]	
1-Benzylidene-4-methylcyclohexane 	136–137 15 [50]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenethylcyclohexene-1 	145 10 [8] 112–113 2 [19]	0.9587 15° [8]	1.5351 19.7° [8] 1.5402 13.7° [19]	
1-Phenyl-1-cyclohexylidene-ethane 	142–143 15 [52A]	0.9573 [52A] 0.9590 D_{20}^{20} [52A] 0.9624 D_0^0 [52A]	1.5401 [52A]	
1-Phenyl-2-cyclohexylidene-ethane 	126–126.5 3 [52A]	0.9908 [52A] 0.9926 D_{20}^{20} [52A] 1.0052 D_0^0 [52A]	1.5540 [52A]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-2-cyclohexylethene 	145–147 14 [44] 145–147 8 [52A]	0.9595 17° [44]	1.53701 17° [44]	
$C_{15}H_{20}$				
1,1-Dimethyl-2-phenyl-3-methylenecyclohexane 	105–107 5 [17]	0.9403 11° [17]	1.53117 11° [17]	
1-Phenethyl-2-methylcyclohexene-1 	161–163 23 [26] 153–154 14 [26]	0.95644 [26] 0.95142 19.4° [26]	1.53804 [26] 1.53617 19.4° [26]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-1-phenethylcyclohexene-2 				
	152–153 20 [26]	0.93492 17.6° [26]	1.52695 17.6° [26]	
$C_{16}H_{22}$				
Cyclopentenylphenylpentane (a)				
	157–158 3 [13]	0.9351 [13]	1.5225 [13]	
(a) The structure of this compound is not given.				
1-Isopropenyl-2-phenyl-4-methylcyclohexane 				
	139–140 10 [24]	0.9462 15.7° [24]	1.5802 15.7° [24]	
1-(4′-Isopropylphenyl)-5-methylcyclohexene (a)				
	157–158 14 [25] 149–150 12 [25]	0.9376 14° [25]	1.5283 14° [25]	
(a) The double bond is in the 2 or 3 position.				
1-Isopropyl-2-phenyl-4-methylcyclohexene (a)				
	149–151 18 [43] 127–130 8 [43]	0.9365 25° [43]	1.5270 [43] 1.5275 [43]	$[\alpha]_D^{17}$ = +43.48° [43] $[\alpha]_D^{17}$ = +16.28° [43]
(a) The position of the double bond is not given.				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Ethyl-2-methyl-2-*p*-tolylcyclohexene-3	136–137 12 [32]			
1,2-Dimethyl-2-(2′,4′-dimethylphenyl)-cyclohexene-3	155–158 12 [31]			
1-Phenethyl-2-ethylcyclohexene-1			1.5306 13.7° [19]	
$C_{17}H_{24}$				
1-(1′,2′,2′,3′-Tetramethylcyclopentyl)-2-phenylethene				
51 [45]	146–149 11 [45]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclopentenylphenylhexane (a)				
	159–160 2 [13]	0.9317 18.5° [13]	1.5220 18.5° [13]	
(a) The structure of this compound is not given.				
1-Methyl-2-benzyl-4-isopropylcyclohexene-1 				
	159 12 [9]	0.9448 15.8° [9]	1.5331 15.8° [9]	
$C_{18}H_{26}$				
1-Phenethyl-2-isopropyl-5-methylcyclohexene-1 				
	145 4 [38]			

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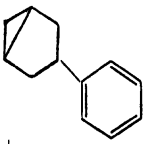
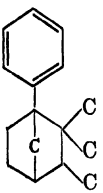
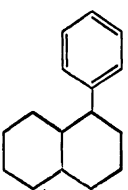
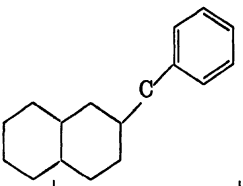
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Phenylbicyclo-[3,1,0]-hexane (a) 				
	241.5–242.5 745 [9]	0.9830 [9]	1.5452 16.5° [9]	
(a) This compound may not be pure.				
$C_{16}H_{22}$				
1-Phenyl-2,2,3-trimethylbicyclo-[2,2,1]-heptane 				
13.5 [6,7]	147.5–148 14 [6,7]	0.9817 [6]	1.5387 [6]	
Phenyldihydropinene (a)				
	286–291 745 [5]	0.9594 D_0^{20} [5]	1.52691 [5]	
(a) This compound is probably a phenyltrimethylbicycloheptane.				
Bornylbenzene (a)				
	276–278.5 756 [3]	0.9586 D_0^{20} [3]	1.5262 25° [4]	
	117–118 1.5 [4]	0.9788 D_0^{0} [4]	1.5275 21° [3]	
(a) This compound is probably a phenyltrimethylbicycloheptane.				
2-Phenylbicyclo-[4,4,0]-decane 				
	163–164 13 [2]	0.9799 14° [2]		

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
ω-Benzylcamphene (a)				
	138–140 5 [8]	0.9668 25° [8]	1.538 25° [8]	
(a) This compound is probably a benzylbicycloheptane.				
p-Bornyltoluene (a) (b)				
	163–164 11 [3]	0.9563 D_0^{20} [3]	1.5297 [3]	
(a) This compound is probably a trimethylbicycloheptyltoluene. (b) This compound may not be pure.				
3-Benzylbicyclo-[4,4,0]-decane 				
	173–175 10 [1]			

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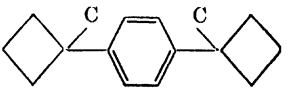
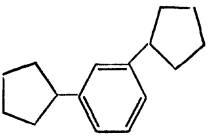
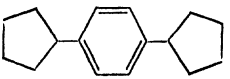
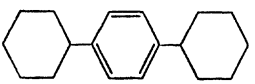
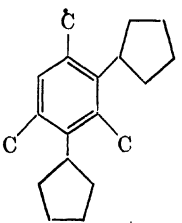
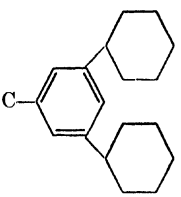
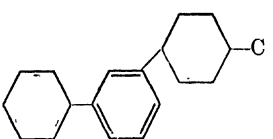
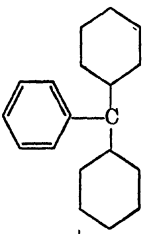
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Di-(1′-methylcyclobutyl)-benzene 				
34 [9]	123–125 6 [9]	0.9344 [9] 0.9198 40° [9]	1.5203 [9]	
1,3-Dicyclopentylbenzene 				
	154–155 4 [13]			
1,4-Dicyclopentylbenzene 				
42–43 [13]				
$C_{17}H_{24}$ **Methyldicyclopentylbenzene** (a)				
	150–152 2 [17]	0.9694 [17]	1.5391 [17]	
(a) The structure of this compound is not given.				
$C_{18}H_{26}$ **Dicyclopentylmethylbenzene** (a)				
101.5–102 [8]				
(a) The structure of this compound is not given.				
1,4-Dicyclohexylbenzene 				
102.0				
103 [10] 102–103 [4,5,20,21] 102 [15]	189–190 14 [21] 192–195 13 [4] 190 12 [10]	1.049 0° [26]		

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Dicyclohexylbenzene (*Continued*)				
101–102 [12]				
100–102 [11]				
101 [24]				
100–101 [6,19]				
100 [22,23]				
Dicylohexylbenzene (a)				
86 [24]	335–340 756 [5]	0.966 [5]	1.5357 [5]	
	165–168 3.5 [12]	0.9668 [12]	1.5362 [12]	
(a) The structure of this compound is not given.				
$C_{19}H_{28}$				
1,3,5-Trimethyl-2,4-dicyclopentylbenzene 				
	164–165 1 [17]	0.9870 [17]	1.5227 [17]	
1-Methyl-3,5-dicyclohexylbenzene 				
93.5 [22]				
Methyldicyclohexylbenzene (a)				
−3 [17]	165–166 3 [17]	0.9645 [17]	1.5378 [17]	
(a) The structure of this compound is not given.				
1-Cyclohexyl-3-(4′-methylcyclohexyl)-benzene 				
	194–198 8 [16]	0.9552 [16]	1.5202 [16]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Methyldicyclohexylbenzene (a)				
82 [24]				
(a) The structure of this compound is not given.				
Phenyldicyclohexylmethane 				
36.5 [14]	210–212 20 [7,25] 146–148 5 [18] 145–148 5 [18] 169–171 3 [1] 161–163 2 [1]	0.9774 [18] 0.9890 [25] 0.9724 D_{25}^{25} [1] 0.9894 13° [7]	1.5390 [18] 1.5391 [18] 1.5372 25° [1]	
$C_{20}H_{30}$				
Dicyclohexyl-1,3-dimethylbenzene (a)				
107 [10]				
(a) The structure of this compound is not given.				
Dicylclohexyl-1,4-dimethylbenzene (a)				
156–157 [2] 155–156 [3]				
(a) The position of the cyclohexyl substituents is not given.				
Dimethyldicyclohexylbenzene (a)				
	230–235 20 [2]	0.962 22° [2]	1.533 22° [2]	
(a) The structure of this compound is not given.				

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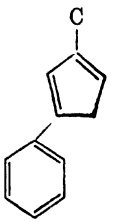
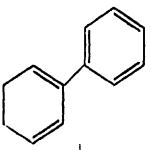
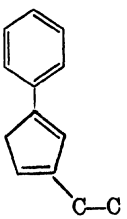
5. BENZENE WITH ONE CYCLODIENYL, ONE ALKENYLCYCLENYL, OR ONE DIALKENYLCYCLYL SUBSTITUTION, C_nH_{2n-12}

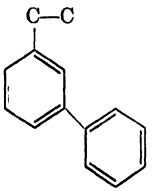
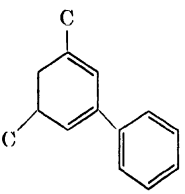
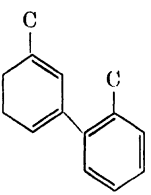
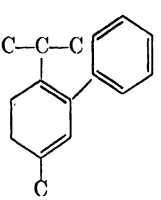
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-4-phenylcyclopentadiene-1,4 				
62[5]	151 12[5]			
Benzylcyclopentadiene (a)				
	115–120 13[1]			

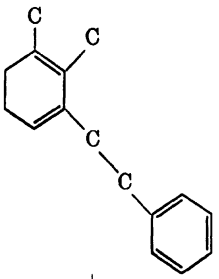
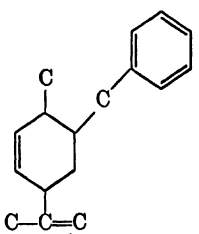
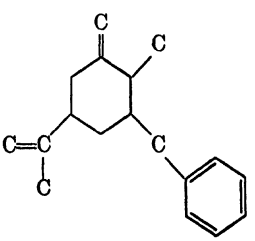
(a) The position of benzyl is given as 1 or 2 and the position of the double bonds is not given.

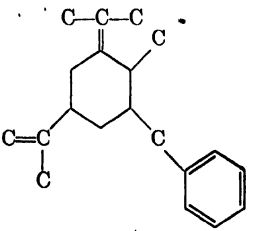
2-Phenylcyclohexadiene-1,3 				
	114 12[7]			
Phenylcyclohexadiene (a)				
66–66.5[8]	247–249[2] 110 10[12]			

(a) The structures were not given. The data may represent more than one compound.

$C_{13}H_{14}$				
1-Phenyl-3-ethylcyclopentadiene-1,3 				
	170–175 12[8]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Ethyl-3-phenylcyclohexadiene-1,3 	126–128 8 [4]			
1,5-Dimethyl-3-phenylcyclohexadiene-1,3 	148 17 [14] 146 17 [6]	0.973 [6] 0.9718 17.5° [11] 0.9772 17.0° [14]	1.5735 [14] 1.5800 [6] 1.57486 17.0° [14] 1.56824 $n_{H\alpha}^{17.0}$ [14] 1.59322 $n_{H\beta}^{17.0}$ [14] 1.61083 $n_{H\gamma}^{17.0}$ [14]	
1-Methyl-3-*o*-tolylcyclohexadiene-1,3 	145–148 21 [9]			
$C_{16}H_{20}$				
1-Isopropyl-2-phenyl-4-methylcyclohexadiene-1,3 	153 18 [13] 145–148 15 [10]	0.9552 25° [10]	1.5525 25° [10]	

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Dimethyl-3-phenethylcyclohexadiene-1,3 	155 6 [3]			
$C_{17}H_{22}$				
1-Methyl-2-benzyl-4-isopropenylcyclohexene-5 	167–169 14 [11]			$[\alpha]_D^{20}$ = −71.76° [11] (a)
(a) Angles of rotation for lines other than *D* are given in reference 11.				
$C_{18}H_{24}$				
1-Methylene-2-methyl-3-benzyl-5-isopropenylcyclohexane 	169–172 11 [11]	0.9456 [11]	1.54718 [11]	$[\alpha]_D^{20}$ = −7.25° [11] (a)
(a) Angles of rotation for lines other than *D* are given in reference 11.				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Isopropylidenyl-2-methyl-3-benzyl-5-isopropenylcyclohexane				
	183–186 13 [11]			$[\alpha]_D^{20}$ = −13.36° [11] (a)

(a) Angles of rotation for lines other than D are given in reference 11.

References on Benzene with One Cyclodienyl, One Alkenylcyclenyl, or Dialkenylcyclyl Substitution

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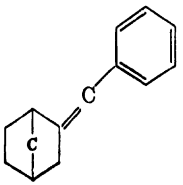
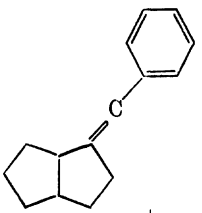
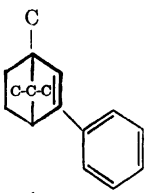
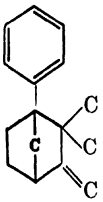
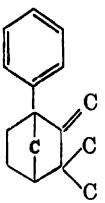
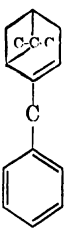
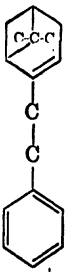
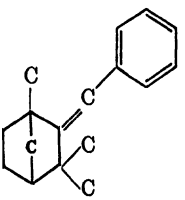
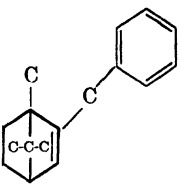
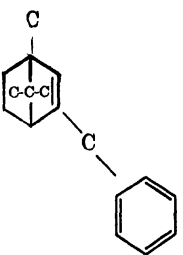
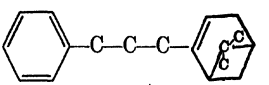
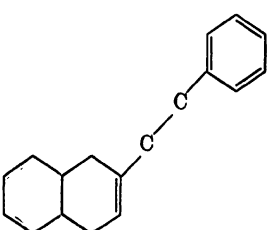
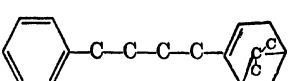
6. BENZENE WITH ONE BICYCLENYL, ONE ALKENYLBICYCLYL, OR ONE BICYCLYLIDENE SUBSTITUTION, C_nH_{2n-12}

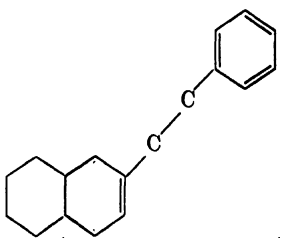
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Benzylidenebicyclo-[2,2,1]-heptane 	146–147 15 [7]			
$C_{15}H_{18}$ **Phenyl-7,7-dimethylbicyclo-[2,2,1]-heptene-2** (a)	135 13 [14]	0.9907 [14]	1.54466 19° [14]	
(a) The position of the phenyl group is not given.				
2-Benzylidene-*cis*-[3,3,0]-bicyclooctane 	126–127 3 [1]			
$C_{16}H_{20}$ **1,7,7,-Trimethyl-3-phenylbicyclo-[2,2,1]-heptene-2** 	138 −141(a) 10 [8]	0.9767(b) [17] 0.9784(b) [17] 0.9865(b) [17] 0.9736(a) D_{11}^{18} [8]	1.54167(b) [17] 1.54445(b) [17] 1.53724(b) $n_{H\alpha}^{20}$ [17] 1.54010(b) $n_{H\alpha}^{20}$ [17] 1.55331(b) $n_{H\beta}^{20}$ [17] 1.55575(b) $n_{H\beta}^{20}$ [17]	$[\alpha]_D^{20}$ = +8.33°(b)[17] $[\alpha]_D^{20}$ = +40.56°(b)[17] (c)

(a) This compound was named β-phenylcamphene by the authors, but the structure indicates that it is 1,7,7-Trimethyl-3-phenylbycyclo-[2,2,1]-heptene-2.
(b) Values for two preparations are given.
(c) Angles of rotation for lines other than *D* are given in reference 17.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-2,2-dimethyl-3-methylenebicyclo-[2,2,1]-heptane 				
32.5 [10,11]	128–129 7 [10,11]	0.9919 [10,11]	1.5449 [10,11]	
1-Phenyl-2-methylene-3,3-dimethylbicyclo-[2,2,1]-heptane 				
	147 16 [10,11] 131 9.5 [10,11]	0.9795 [10,11]	1.5447 [10,11]	
Phenylmethylenedimethylbicycloheptane (a)				
	99 2 [2]	0.9920 140° [2]		$[\alpha]_D^{19}$ = +3.27° [2]
(a) The structure of this compound is not given.				
4-Benzyl-7,7-dimethylbicyclo-[3,1,1]-heptene-3 				
	138–141 12 [16]	0.9712 [16]		$[\alpha]_D^{20}$ = +29.486° [16] (a)
(a) Angles of rotation for lines other than D are given in reference 16.				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4-Phenethyl-7,7-dimethylbicyclo-[3,1,1]-heptene-3 	151–152 10 [16]	0.9633 [16]		$[\alpha]_D^{20}$ = +16.182° [16] (a)
(a) Angles of rotation for lines other than *D* are given in reference 16.				
1,3,3-Trimethyl-2-benzylidenebicyclo-[2,2,1]-heptane 	152–154 14–15 [9]		1.5472 $n_{H\gamma}^{19.9}$	$[\alpha]_D^{18}$ = +71.89° [9]
1,7,7-Trimethyl-2-benzylbicyclo-[2,2,1]-heptene-2 	170–171 20 [8] 160–161 10 [8] 157–160 10 [8]			
1,7,7-Trimethyl-3-benzylbicyclo-[2,2,1]-heptene-2 	150–160 11 [8]			

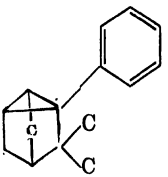
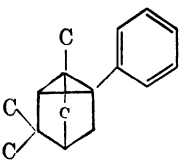
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Benzyloctahydronaphthalene (a)				
	151 6[4] 145(b) 3[1]		1.5520 12.8°[4]	
(a) The positions of the hydrogen atoms are not given. (b) This constant was determined on the *trans* isomer.				
$C_{18}H_{24}$ **1,7,7-Trimethyl-ethyl-phenylbicyclo-[2,2,1]-heptene-2** (a)				
	165–168 12[15]			
(a) The positions of ethyl and phenyl are not given.				
1-Phenyl-3-[4′-(7′,7′-dimethylbicyclo-[3,1,1]-hepten-3′-yl)]-propane 				
	167.5 −168 10.5[16] 166–167 10[16]	0.9574[16]	1.53116[16] 1.52715 $n_{H\alpha}^{20}$[16] 1.54119 $n_{H\beta}^{20}$[16]	$[\alpha]_D^{20}$ = −4.5787°[16] (a)
(a) Angles of rotation for lines other than *D* are given in reference 16.				
3-Phenethylbicyclo-[4,4,0]-decene-3 				
	155 3–4[3] 148–149 0.9[5]		1.5402 18.7°[3] 1.5449 16.7°[5]	
$C_{19}H_{26}$ **1-Phenyl-4-[2′-(7′,7′-dimethylbicyclo-[3,1,1]-hepten-2′-yl)]-butane** 				
	182.5 −183.5 10[16]	0.9522[16]		$[\alpha]_D^{20}$ = +4.957°[16] (a)
(a) Angles of rotation for lines other than *D* are given in reference 16.				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Benzylidenecamphane (a)				
25 [12,13,18]	160–161 10–11 [12,13]	0.9753 30° [12,13] 0.9788 25° [12,13]	1.56280 30.2° [12] 1.55717 $n_{H\alpha}^{30.2}$ [12] 1.57768 $n_{H\beta}^{30.2}$ [12] 1.59116 $n_{H\gamma}^{30.2}$ [12]	
(a) This compound is probably a benzylidene-2,2,3-trimethylbicyclo-[1,2,2]-heptane.				
3-(2′-Methylphenethyl)-bicyclo-[4,4,0]-decene-3 				
	160–162 0.7 [6]			

References on Benzene with One Bicyclenyl, Alkenylbicyclyl, or Bicyclylidene Substitution

1. Barrett, J. W., and R. P. Linstead, J. Chem. Soc. **1936**, 611.
2. Bredt, J., J. prakt. Chem. [2] **98**, 96 **1918**.
3. Cook, J. W., and C. L. Hewett, J. Chem. Soc. **1934**, 365.
4. Cook, J. W., and C. L. Hewett, J. Chem. Soc. **1936**, 62.
5. Cook, J. W., and C. A. Lawrence, J. Chem. Soc. **1937**, 817.
6. Cook, J. W., A. M. Robinson, and F. Goulden, J. Chem. Soc. **1937**, 393.
7. Diels, O., and K. Alder, Ann. **470**, 62 **1929**.
8. Haller, A., and E. Bauer, Compt. rend. **142**, 677 **1906**.
9. Leroide, J., Compt. rend. **148**, 1611 **1909**.
10. Nametkin, S., A. Kichkin, and D. Kursanov, J. prakt. Chem. [2] **124**, 144 **1929**.
11. Nametkin, S. S., A. S. Kichkin, and D. N. Kursanov, J. Russ. Phys. Chem. Soc. **61**, 1065 **1929**; Chem. Zentr. **1930**, I, 1300.
12. Nametkin, S. S., and M. K. Strugatzkiĭ, Ber. **69**, 2272 **1936**.
13. Nametkin, S. S., and M. K. Strugatzkiĭ, J. Gen. Chem. (U.S.S.R.) **6**, 862 **1936**; C.A. **30**, 6727 **1936**; Chem. Zentr. **1937**, I, 1953.
14. Nordström, A. M., Hyllningsskrift tillägnad Ossian Aschan **1920**, 129; C.A. **16**, 2135 **1922**.
15. Rupe, H., and K. Glenz, Ann. **436**, 184 **1924**.
16. Rupe, H., and A. Héritier, Ann. **459**, 171 **1927**.
17. Rupe, H., and A. Wirz, Verhandl. naturforsch. Ges. Basel **38**, 164 **1927**.
18. Shavrygin, A. I., J. Gen. Chem. (U.S.S.R.) **7**, 2668 **1937**; Chem. Zentr. **1938**, I, 3056.

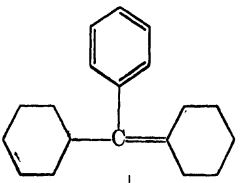
7. BENZENE WITH ONE TRICYCLYL SUBSTITUTION, C_nH_{2n-12}

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Phenyl-3,3-dimethyltricyclo-[2,2,1,0 ^{2,6}]-heptane 				
	96–97 5 [1]	1.00609 10.25° [1]	1.54710 10.25° [1]	
$C_{16}H_{20}$				
1,5,5-Trimethyl-2-phenyltricyclo-[2,2,1,0 ^{2,6}]-heptane 				
	127–128 11 [2]	0.9708 [2]	1.53202 [2]	

References on Benzene with One Tricyclyl Substitution

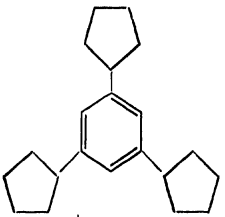
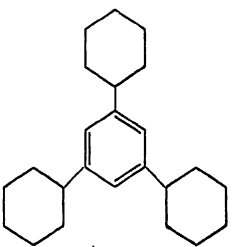
1. Bredt-Savelsberg, M., Ber. **56**, 554 1923.
2. Komppa, G., and G. A. Nyman, Ann. **533**, 290 1938.

8. BENZENE WITH ONE CYCLYL AND ONE CYCLENYL OR CYCLYLIDENE SUBSTITUTION, C_nH_{2n-12}

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Cyclohexyl-4-cyclohexenylbenzene (a)				
97–98 [4]	225–230 18 [4]			
(a) The position of the double bond in cyclohexene is not given.				
Methylcyclohexylcyclohexenylbenzene (a)				
108–110 [4]	165 0.7 [4]			
(a) The structure of this compound is not given.				
Phenylcyclohexylcyclohexylidenemethane 				
45 [3]	178 11 [3] 180 10 [3] 134–135 0.3 [1]	0.982 23° [1]	1.545 23° [1]	

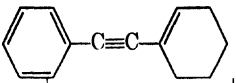
References on Benzene with One Cyclyl and One Cyclenyl or Cyclylidene Substitution

1. Conant, J. B., L. F. Small, and A. W. Sloan, J. Am. Chem. Soc. **48**, 1743 1926.
2. Godchot, M., Bull. soc. chim. [4] **7**, 956 1910.
3. Neunhöffer, O., Ann. **509**, 115 1934.
4. von Braun, J., G. Irmisch, and J. Nelles, Ber. **66**, 1471 1933.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3,5-Tricyclopentylbenzene 				
60–61 [2]	201–202 4 [2]			
$C_{24}H_{36}$				
1,3,5-Tricyclohexylbenzene 				
68.5–69 [1] 68 [3]				

References on Benzene with Three Cyclyl Substitutions

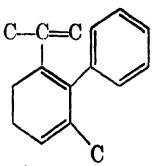
1. Corson, B. B., and V. N. Ipatieff, J. Am. Chem. Soc. **59**, 645 1937.
2. Nametkin, S. S., and E. S. Pokrovskaya, J. Gen. Chem. (U.S.S.R.) **8**, 699 1938; C.A. **33**, 1298 1939.
3. Tsukervanik, I. P., and N. G. Sidorova, J. Gen. Chem. (U.S.S.R.) **7**, 641 1937; C.A. **31**, 5780 1937; Chem. Zentr. 1938, I, 579.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Phenylcyclohexen-1-ylethyne 				
	167–170 16 [2] 117 −118.5 1.5 [2]	0.9391 [3]	1.6033 [3]	
$C_{15}H_{16}$ **Phenyl-3-methylcyclohexenylethyne** (a)				
	167–168 10 [1]			

(a) The double bond is in either the one or the six position of the cyclohexene.

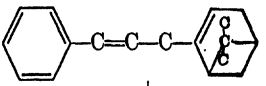
References on Benzene with One Cyclenylalkynyl Substitution

1. Bertrond, E., J. Russ. Phys. Chem. Soc. **37**, 655 1905; Chem. Zentr. 1905, II, 1020.
2. Hurd, C. D., and R. N. Jones, J. Am. Chem. Soc. **56**, 1924 1934.
3. Pinkney, P. S., G. A. Nesty, D. E. Pearson, and C. S. Marvel, J. Am. Chem. Soc. **59**, 2666 1937.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Methylenecyclopentadienylbenzene (a)				
31 [3]				
(a) The structure of this compound is not given.				
$C_{13}H_{12}$ **Methylenecyclopentadienylmethylbenzene** (a)				
	130.5 10.5 [3]	1.021 D_{20}^{20} [1]		
(a) The structure of this compound is not given.				
$C_{16}H_{18}$ **1-Isopropenyl-2-phenyl-3-methylcyclohexadiene-1,3** 				
	149–150 10 [2]	0.9714 [2]	1.56736 [2] 1.56106 $n_{H\alpha}^{20}$ [2] 1.58273 $n_{H\beta}^{20}$ [2] 1.59686 $n_{H\gamma}^{20}$ [2]	$[\alpha]_D^{20}$ = +67.28° [2] (a)
(a) Angles of rotation for lines other than *D* are given in reference 2.				

References on Benzene with One Alkenylcyclodienyl Substitution

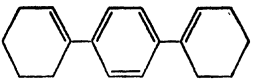
1. Lovell, W. G., J. M. Campbell, F. K. Signaigo, and T. A. Boyd, Ind. Eng. Chem. **26**, 475 1934.
2. Rupe, H., and W. Tomi, Ber. **47**, 3064 1914.
3. Thiele, J., Ber. **33**, 666 1900.

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-3-[4′-(7′,7′-dimethylbicyclo-[3,1,1]-hepten-3′-yl)]-propene-1 				
	167.5 −168.5 10 [2]	0.9683 [2]	1.54534 [2] 1.54074 $n_{H\alpha}^{20}$ [2]	$[\alpha]_D^{20}$ = +13.050° [2] (a)
(a) Angles of rotation for lines other than *D* are given in reference 2.				
1-Phenyl-1-camphenylethene (a)				
	126–127 0.19 [1] 104–105.5 0.07 [1]	1.0033 10.3° [1]		
(a) The structure of this compound is not given.				

References on Benzene with One Bicyclenylalkenyl Substitution

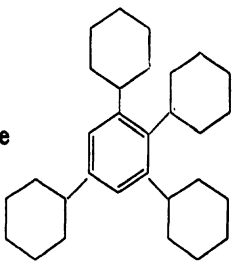
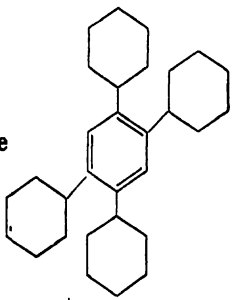
1. Lipp, P., and M. Quaedrlieg, Ber. 62, 2311 1929.
2. Rupe, H., and A. Héritier, Ann. 459, 171 1927.

13. BENZENE WITH TWO CYCLENYL SUBSTITUTIONS, C_nH_{2n-14}

M. P.,°C	B. P.,°C @ 760mm	D^{20}	n_D^{20}	Additional Data
1,4-(Dicyclohexen-1′-yl)-benzene 				
110[1]				

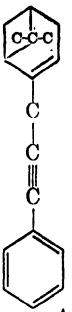
References on Benzene with Two Cyclenyl Substitutions

1. von Braun, J., G. Irmisch, and J. Nelles, Ber. **66**, 1471 1933.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Tetracyclopentylbenzene (a)				
200–201 [3]				
(a) The structure of this compound is not given.				
$C_{30}H_{46}$				
1,2,3,5-Tetracyclohexylbenzene 				
264–265 [1]				
1,2,4,5-Tetracyclohexylbenzene 				
265–266 [2]				

References on Benzene with Four Cyclyl Substitutions

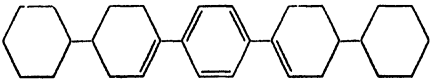
1. Corson, B. B., and V. N. Ipatieff, J. Am. Chem. Soc. **59**, 645 1937.
2. Nametkin, S. S., and E. S. Pokrovskaya, J. Gen. Chem. (U.S.S.R.) **7**, 962 1937; C.A. **31**, 5332 1937; Chem. Zentr. 1937, II, 1569.
3. Nametkin, S. S., and E. S. Pokrovskaya, J. Gen. Chem. (U.S.S.R.) **8**, 699 1938; C.A. **33**, 1298 1939.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-3-[4′-(7′,7′-dimethylbicyclo-[3,1,1]-hepten-4′-yl)]-propyne-1 				
	177.5–178.5 10[1] 89-90 0[1]	0.9896[1]	1.56336[1] 1.55804 $n_{H\alpha}^{20}$[1] 1.57735 $n_{H\beta}^{20}$[1]	$[\alpha]_D^{20}$ = +18.725°[1] (a)

(a) Angles of rotation for lines other than *D* are given in reference 1.

References on Benzene with One Bicyclenylalkynyl Substitution

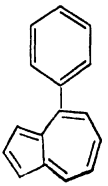
1. Rupe, H., and A. Héritier, Ann. **459**, 171 **1927**.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Di-(4′-cyclohexylcyclohexen-1′-yl)-benzene 				
240–245 [1]	250 0.7 [1]			

References on Benzene with Two Cyclylcyclenyl Substitutions

1. von Braun, J. G. Irmisch, and J. Nelles, Ber. 66, 1471 1933.

17. BENZENE WITH ONE BICYCLOPENTAENYL SUBSTITUTION, C_nH_{2n-20}

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Phenylbicyclo-[5,3,0]-decapentaene-2,4,6,8,10 (4-Phenylazulene)				
210–211[1]				

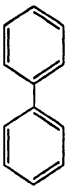
References on Benzene with One Bicyclopentaenyl Substitution

1. St. Pfau, A., and P. A. Plattner, Helv. Chim. Acta 19, 858 1936.

IV. BIPHENYL AND ITS ALIPHATIC DERIVATIVES

1. Biphenyl C_nH_{2n-14}
2. Biphenyl with Alkyl Substitutions C_nH_{2n-14}
3. Biphenyl with One Alkenyl Substitution C_nH_{2n-16}
4. Biphenyl with Two Alkenyl Substitutions C_nH_{2n-18}

1. BIPHENYL, C_nH_{2n-14}

M. P., °C	B. P., °C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
Biphenyl (Diphenyl) 							
70.0	**254.9**		**0.9712**	**100°**			Crit. Temp., °C.
71–72 [30,149]	255.9 [112]		1.041 [102]		1.614 [102]		495.6 [74,79]
71.0 [202]	255.27 [136]		0.5540	482.2° [136]	1.61589 [101]		374.5 [36]
71(a)	255.25 [40]		0.6104	454.4° [136]	1.58728_5	77.14° [195]	
70.5–71 [18,97]	255 [22,185]		0.6551	426.7° [136]	1.58822	77.1° [193]	Crit. Pressure, mm. Hg
70–71(b)	254.93 [89]		0.6934	398.9° [136]	1.56841	$n_{H\alpha}^{99.0}$ [153]	24,168.0 [79]
70.8 [123]	254.9 [23]		0.7270	371.1° [136]	1.58112	$n_{H\alpha}^{77.1}$ [193]	
70.5(c)	254(f)		0.7578	343.3° [136]	1.58189	$n_{H\alpha}^{73}$ [54]	
70–70.5 [89]	252 [190]		0.7856	315.6° [136]	1.59441	$n_{H\beta}^{99.0}$ [153]	
70.2 [55]	250–252 [214]		0.8127	287.8° [136]	1.60760	$n_{H\beta}^{77.1}$ [193]	
70.0–70.2 [81]	257.37	800 [89]	0.8382	260.0° [136]	1.60836	$n_{H\beta}^{73}$ [54]	
70.0 [138]	257.06	795 [89]	0.8425	255.3° [136]	1.61158	$n_{H\gamma}^{99.0}$ [153]	
70(d)	256.76	790 [89]	0.8620	232.2° [136]	1.62538	$n_{H\gamma}^{77.1}$ [193]	
69–70 [2,3,73,140,209,211]	256.45	785 [89]	0.8849	204.4° [136]	(j)		
69.85 [26]	256.15	780 [89]	0.9053	179.4° [48]			
69.8 [37,53]	255.85	775 [89]	0.9075	176.7° [136]			
69.6–69.7 [94]	255.54	770 [89]	0.9272	152.0° [27]			
69.6 [41]	255.24	765 [89]	0.9304	148.7° [136]			
69.5 [9,93,141,210]	254	762 [171,172]	0.9372	138.8° [92]			
69–69.5 [157]	253.8		0.9526	121.1° [136]			
68.5–69.5 [91]	−254.4	759 [127]	0.9593	118.0° [48]			
69.4 [68,213]	248–249	756.5 [91]	0.9611	109.66° [92]			
69.22 [136]	254.62	755 [89]	0.9626	108.6° [27]			
69.2 [40]	253.8	754.15 [171]	0.9649	105° [53]			
69.1 [86,90,137]	254	754 [23]	0.97165	99° [153]			
69.0 [89,113,114,115]	254.32	750 [89]	0.9748	93.3° [136]			
69(e)	254.01	745 [89]	0.9855	83.4° [48]			
68.5–69 [212]	253.71	740 [89]	0.9852	82.33° [26]			
68–69 [43,119]	253.40	735 [89]	0.9845	82.0° [27]			
68.95 [198]	253.10	730 [89]	0.9857	80.1° [92]			
68.90 [92]	252.79	725 [89]	0.9878	79.53° [26]			
68.9 [50]	252–253	721.9 [27]	0.9890	77.14° [195]			
68.6 [152]	252.48	720 [89]	0.9896	77.1° [193]			
68.5 [66]	252.9	716 [16]	0.9902	77.02° [26]			
68.3 [179]	252.16	715 [89]	0.9915	75.03° [26]			
68 [110,178]	251.3		0.9893	75° [53]			
	−252.8	714.7 [42A]	0.9919	73.0° [92]			
	251.85	710 [89]	0.9919	73° [54]			
	251.53	705 [89]	0.9946	72.01° [26]			
	251.21	700 [89]	0.9970	70.52° [26]			

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}	Additional Data
Biphenyl (*Continued*)	250.57	690 [89]	0.9961	70.5° [165]		
	249.92	680 [89]	1.0002	67.03° [26]		
	249.27	670 [89]	1.0032	62.61° [26]		
	248.61	660 [89]	1.0046	61.12° [26]		
	247.94	650 [89]	1.0031	60° [92]		
	247.26	640 [89]	1.0072	58.56° [26]		
	246.57	630 [89]	1.1453	30.53°		
	245.87	620 [89]		(solid) [26]		
	245.15	610 [89]	1.17466(g)	24.9° [82]		
	244.42	600 [89]	1.17470(g)	24.8° [82]		
	243.68	590 [89]	1.17507(g)	24.8° [82]		
	242.93	580 [89]	1.17455(g)	24.4° [82]		
	242.18	570 [89]	1.17544(g)	24.4° [82]		
	241.41	560 [89]	1.17560(g)	24.2° [82]		
	240.63	550 [89]	1.17520(g)	24.1° [82]		
	239.84	540 [89]	1.1545	19.05°		
	239.04	530 [89]		(solid) [26]		
	238.23	520 [89]	1.120(g)	17° [52]		
	237.41	510 [89]	1.1632	9.02°		
	236.58	500 [89]		(solid) [26]		
	235.74	490 [89]	1.180(g)	0° [215]		
	234.89	480 [89]	1.154(h) (solid) [139]			
	234.02	470 [89]	1.165(i)(h) (solid) [169]			
	233.14	460 [89]				
	230	458 [23]				
	232.22	450 [89]				
	231.28	440 [89]				
	230.33	430 [89]				
	229.36	420 [89]				
	228.38	410 [89]				
	227.39	400 [89]				
	226.38	390 [89]				
	225.36	380 [89]				
	224.32	370 [89]				
	223.26	360 [89]				
	222.19	350 [89]				
	221.09	340 [89]				
	220.00	330 [89]				
	218.90	320 [89]				
	217.79	310 [89]				
	216.65	300 [89]				
	215.50	290 [89]				
	214.34	280 [89]				
	213.18	270 [89]				
	212.01	260 [89]				
	210.80	250 [89]				
	188	200 [23]	* $\frac{1}{T_b} = 0.0029665 - 0.0003724 \log_{10} p_{mm}$ (340 to 800 mm)			
	145	22 [196]				
	127–128	14 [80]	† $\frac{dD}{dt} = -0.0008170[1 + 0.0004558(t - 100)]/°C$ (58 to 233°C)			
	130–132	10 [183]				

(a) The melting point 71 is found in references 42, 47, 51, 55, 80, 84, 88, 100, 118, 121, 122, 124, 125, 126, 131, 133, 143, 144, 145, 159, 162, 167, 170, 177, 190, 199, 207.
(b) The melting point 70-71 is found in references 8, 11, 24, 28, 33, 99, 106, 150, 180, 200.
(c) The melting point 70.5 is found in references 1, 6, 10, 15, 20, 21, 31, 35, 49, 55, 56, 60, 67, 70, 76, 101, 111, 117, 130, 132, 135, 155, 158, 163, 164, 165, 166, 168, 182, 186, 189, 191, 192, 193, 204, 208.
(d) The melting point 70 is found in references 7, 12, 13, 14, 17, 19, 25, 29, 32, 34, 36, 38, 39, 45, 57, 58, 61, 62, 64, 65, 69, 71, 72, 75, 77, 78, 83, 87, 95, 96, 103, 104, 105, 107, 109, 116, 120, 128, 129, 134, 146, 147, 148, 151, 154, 156, 161, 174, 175, 176, 178, 181, 184, 188, 205.
(e) The melting point 69 is found in references 44, 46, 98, 160, 187, 196, 201, 203.
(f) The boiling point 254 is found in references 4, 5, 17, 32, 63, 64, 80, 85, 100, 101, 108, 117, 130, 162, 163, 168, 191, 194, 197, 200, 206.
(g) These densities were apparently determined on the solid.
(h) The temperature of this density is not given.
(i) This density is the average of two determinations.
(j) Refractive indices at other lines may be found in references 92, 142, 153.

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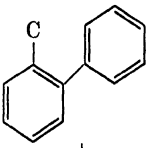
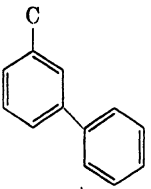
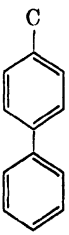
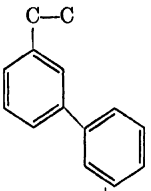
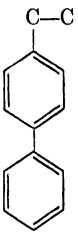
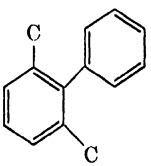
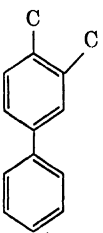
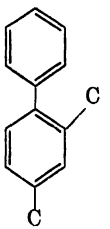
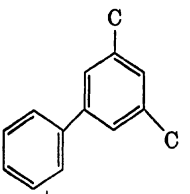
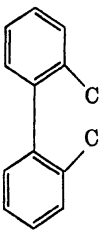
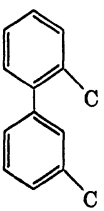
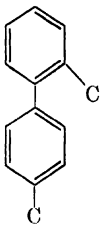
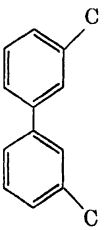
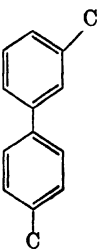
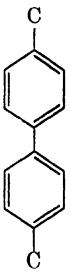
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-2-phenylbenzene 				
	260			
	261–264 [18,55,56]	1.010 [34]		
	261–263 [22,55]			
	260 [69]			
	255–258 [11,26,34,43]			
	130–136 27 [72]			
1-Methyl-3-phenylbenzene 				
	270			
	272–277 [1]	1.0121 [41]	1.6029 [78]	
	272–274 [78]	1.010 22° [72]	1.60355 [41]	
	270–272 [34]	1.012 17° [34]	1.5916 22° [72]	
	270 [57]	1.0182 16.7° [78]	1.60443 16.7° [78]	
	267–269 [11,26]	1.031 0° [1]	1.59747 $n_{H\alpha}^{16.7}$ [78]	
	269 748 [41]		1.62386 $n_{H\beta}^{16.7}$ [78]	
	148–150 20 [72]			
1-Methyl-4-phenylbenzene 				
48.5	**267**			
51 [61]	267–268 [26]			
50 [11]	263–268 [13]			
49–50 [37]	267 [69]			
48 [41]	263–267 [18,22]			

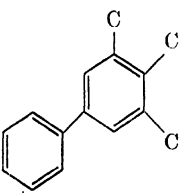
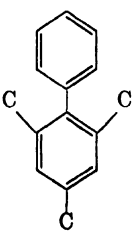
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-4-phenylbenzene *(Continued)*				
47–48 [21,23,81] 47.7 [26] 47.5 [72]	134–136 15 [72]			
$C_{14}H_{14}$				
1-Ethyl-3-phenylbenzene 	286–288 774 [1] 283–284 763 [1]	1.043 0° [1]		
1-Ethyl-4-phenylbenzene 				
46–47 [78]	140 15 [78]			
1,3-Dimethyl-2-phenylbenzene 	260–265 [33]			
1,2-Dimethyl-4-phenylbenzene 	284–287 [32] 281–283 [23,24]			

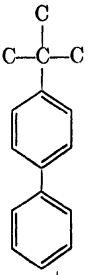
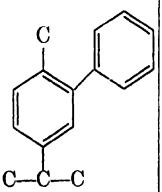
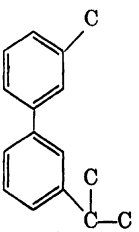
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-2,4-dimethylbenzene 	264–267 [27]			
1,3-Dimethyl-5-phenylbenzene 	273–276 [32]			
2,2′-Dimethylbiphenyl 				
18 [75] 17–18 [47] 17.8 [76] 17.0 [4,20]	257–259 [46] 258 [7] 256–258 [47] 258 737.6 [76]			
2,3′-Dimethylbiphenyl 	273–276 [46] 270 [69A]	0.9984 22° [46]	1.5848 22° [46]	

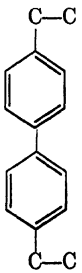
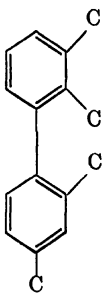
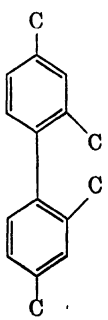
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,4′-Dimethylbiphenyl 	283–288 [12] 273–276 [26]			
3,3′-Dimethylbiphenyl 				
5–7 [70]	287–288 [57] 286 [46] 280–284 [50] 283 [11] 283 718 [76] 287–288 716 [70] 286 716 [73] 286–287 713 [70] 154 14 [58] 138–139 5 [9]	0.9993 16° [73]		
3,4′-Dimethylbiphenyl 				
14–15 [41]	288–289 752 [41]	0.998 [41]	1.59713 [41]	

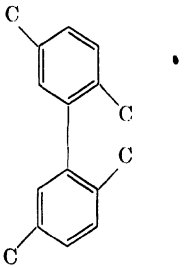
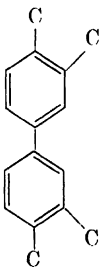
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4,4′-Dimethylbiphenyl 				
121.6				
125 [30,48]	296 [69]	0.9172 121° [67]	1.531 22° [65]	
122–123 [79]	295 [76]	0.9993 D_0^{20} [65]		
122 [76,77]	292–293 752 [41]	1.102 (solid) [48,49]		
121–122 [28,41,74]				
121(a)				
120.8–121 [67]				
120–121 [82]				
120 [62]				
119.5–120 [58]				
119–120 [25]				
118–119 [5]				

(a) The melting point 121 is found in references 6, 11, 12, 16, 19, 26, 54, 63, 65, 66, 69, 71, 83.

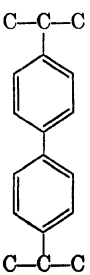
$C_{15}H_{16}$				
1,2,3-Trimethyl-5-phenylbenzene 				
	175–185 23 [32]			
1-Phenyl-2,4,6-trimethylbenzene 				
	275–277 [31]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-*tert*-Butyl-4-phenylbenzene 				
51–52 [29]				
1-Methyl-2-phenyl-4-isopropylbenzene 				
	268 752 [35]	0.9676 [64]	1.56764 [64]	
	156–157 14 [64]	0.9776 15° [36]	1.56797 15° [36]	
	153–154 14 [35]	0.9822 13.8° [35]	1.5670 13.8° [35]	
	143 14 [36]		1.56149 $n_{H\alpha}^{20}$ [64]	
	148.5		1.56228 $n_{H\alpha}^{15}$ [36]	
	–149.5 10 [64]		1.58239 $n_{H\beta}^{20}$ [64]	
			1.58266 $n_{H\beta}^{15}$ [36]	
			1.59553 $n_{H\gamma}^{20}$ [64]	
			1.59626 $n_{H\gamma}^{15}$ [36]	
3-Methyl-3′-isopropylbiphenyl 				
	158 19.5 [72]			

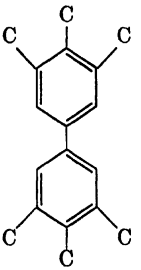
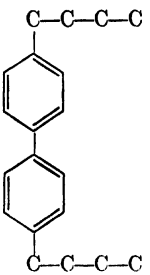
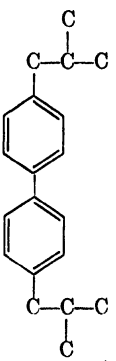
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4,4′-Diethylbiphenyl  80[68]				
2,2′,3,4′-Tetramethylbiphenyl 	162–163 12[42]			
2,2′,4,4′-Tetramethylbiphenyl  41[76]	288 722[76]			

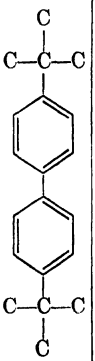
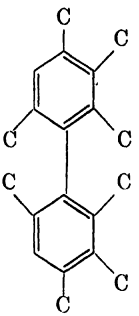
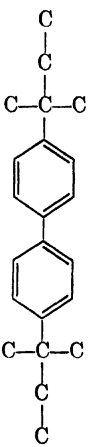
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2′,5,5′-Tetramethylbiphenyl 				
50 [76]	284 732 [76]			
3,3′,4,4′-Tetramethylbiphenyl 				
76–77 [17,60]				
$C_{18}H_{22}$				
Hexylphenylbenzene (a)				
−36 [59]	149-151 4 [59]	0.9613 [59]	1.5640 [59]	
−40 [59]	141–143 2.5 [59]	0.9648 [59]	1.5641 [59]	
			1.5660 15° [59]	
			1.5665 15° [59]	

(a) The structure of this compounds is not given, but the author indicates that there are two isomeric forms.

4,4′-Diisopropylbiphenyl 				
64–65 [8] 49 [10,68]	335 [8]			

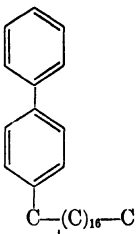
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2′,3-Trimethyl-4′-isopropylbiphenyl				
197 [7]				
2,2′,4,4′,5,5′-Hexamethylbiphenyl				
52 [76]	320 738 [76]			
2,2′,4,4′,6,6′-Hexamethylbiphenyl				
100.2				
100.5 [50,76] 100–100.5 [3,58] 100 [45] 99.5–100 [53]	296 735 [76]	1.023 (solid) [40]		

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3,3′,4,4′,5,5′-Hexamethylbiphenyl 				
132–133 [44]				
$C_{20}H_{26}$ **4,4′-Di-*n*-butylbiphenyl** 				
58–59 [10]	228–230 14 [10]	0.9499 15° [10]	1.5503 19° [10]	
4,4′-Di-*sec*-butylbiphenyl 				
	222–224 20 [10]	0.9530 15° [10]	1.5577 16° [10]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4,4′-Di-*tert*-butylbiphenyl 				
128–129 [14,15] 122 [68]	190–192 13 [14,15]			
2,2′,3,3′,4,4′,6,6′-Octamethylbiphenyl 				
121–122 [38]				
$C_{22}H_{30}$ 4,4′-Di-*tert*-pentylbiphenyl 				
	224 16 [10]			

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
Dihexylbiphenyl (a)							
−28 [59]	185–188	3.5 [59]	0.9343 [59]		1.5449 [59]		
−30 [59]	192–194	2.5 [59]	0.9349 [59]		1.5452 [59]		
	180–181	2.5 [59]	0.9353 [59]		1.5467	15° [59]	
					1.5470	15° [59]	
					1.5473	15° [59]	

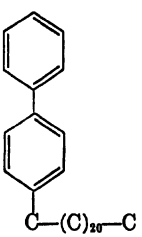
(a) The structure of this compound is not given, but the author indicates that there are three isomeric forms.

$C_{30}H_{46}$							
1-Phenyl-4-octadecylbenzene 							
79.81 [52]	270–275	5 [52]	0.9138(a)	25° [51]	1.5031	80° [80]	
77.5–78 [51]							

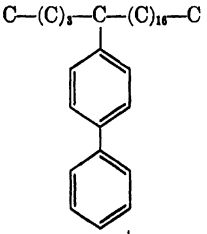
(a) This density is an extrapolated value.

Trihexylbiphenyl (a)							
−22 [59]	228–231	2.5 [59]	0.9140 [59]		1.5302 [59]		
−23 [59]	220–222	2.5 [59]	0.9154 [59]		1.5327 [59]		
	210–212	2 [59]	0.9167 [59]		1.5332 [59]		
					1.5330	15° [59]	

(a) The structure of this compound is not given but the author indicates that there are three isomeric forms.

$C_{34}H_{54}$							
1-Phenyl-4-docosylbenzene 							
82–84.5 [51]			0.9092(a)	25° [51]			

(a) This density is probably an extrapolated value.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
5-*p*-Biphenylyldocosane 				
41.5–43 [51,52]	200–201 2 [52]	0.899 25° [51]	1.5158 [51]	
$C_{38}H_{62}$ **5-*p*-Biphenylylhexacosane**				
44–45 [51]		0.9269(a) 25° [51]		

(a) This density is an extrapolated value.

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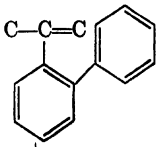
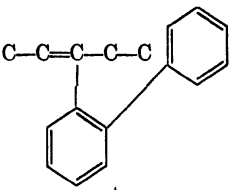
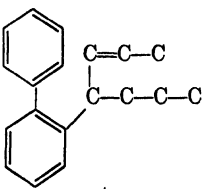
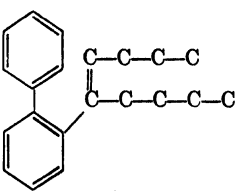
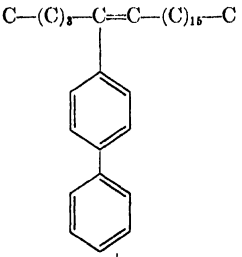
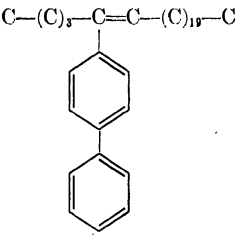
3. BIPHENYL WITH ONE ALKENYL SUBSTITUTION, C_nH_{2n-16}

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Isopropenyl-2-phenylbenzene 	125–128 7[1]			
$C_{17}H_{18}$				
3-*o*-Biphenylylpentene-2 	138–141 7[1]			
$C_{19}H_{22}$				
4-*o*-Biphenylylheptene-2 	155–157 8[1]			
$C_{21}H_{26}$				
5-*o*-Biphenylylnonene-4 	178–179 7[1]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
5-*p*-Biphenylyldocosene-5 				
37–38 [2]		0.9120(a) 25° [2]	1.5306 25° [2]	
(a) This density is an extrapolated value.				
$C_{38}H_{60}$ **5-*p*-Biphenylylhexacosene-5** 				
37–39 [2]		0.9052(a) 25° [2]	1.5252 25° [2]	
(a) This density is an extrapolated value.				

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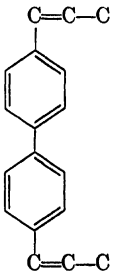
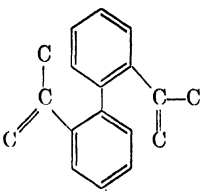
4. BIPHENYL WITH TWO ALKENYL SUBSTITUTIONS, C_nH_{2n-18}

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4,4′-Di-(propen-1″-yl)-biphenyl 186 [2]				
2,2′-Diisopropenylbiphenyl 97–98 [1]				

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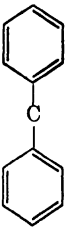
V. TWO PHENYL SUBSTITUTIONS ON ALIPHATICS

1. Two Phenyl Substitutions on Alkanes C_nH_{2n-14}
2. Two Phenyl Substitutions on Alkenes C_nH_{2n-16}
3. Two Phenyl Substitutions on Alkynes C_nH_{2n-18}
4. Two Phenyl Substitutions on Alkadienes C_nH_{2n-18}
5. Two Phenyl Substitutions on Alkenynes C_nH_{2n-20}
6. Two Phenyl Substitutions on Alkatrienes C_nH_{2n-20}
7. Two Phenyl Substitutions on Alkadiynes C_nH_{2n-22}
8. Two Phenyl Substitutions on Alkadienynes C_nH_{2n-22}
9. Two Phenyl Substitutions on Alkatetraenes C_nH_{2n-22}
10. Two Phenyl Substitutions on Alkapentaenes C_nH_{2n-24}
11. Two Phenyl Substitutions on Alkahexaenes C_nH_{2n-26}
12. Two Phenyl Substitutions on Alkaheptaenes C_nH_{2n-28}
13. Two Phenyl Substitutions on Alkatetraynes C_nH_{2n-30}
14. Two Phenyl Substitutions on Alkaoctaenes C_nH_{2n-30}
15. Two Phenyl Substitutions on Alkaundecaenes C_nH_{2n-36}

1. TWO PHENYL SUBSTITUTIONS ON ALKANES, C_nH_{2n-14}

M. P., °C	B. P., °C @ 760mm	D_4^{20}		n_D^{20}		Additional Data
Diphenylmethane 						
25.9	**263.2**	**1.0059**				Crit. Temp., (°C)
28 [66]	264–266 [82]	1.0060 [95]		1.57683 [95]		555.8 [63]
27–28 [5]	265.6 [54]	1.006 [47]		1.5770 [36]		529.0 [100]
27.04 [8]	265 [6]	1.008 [25]		1.577 [47]		497.0 [33,34,72]
27(a)	264–265 [74]	1.0152	210.0° [23]	1.5772 [79]		Crit. Pressure, (mm Hg)
26–27 [14,84,95,110]	264.7 [71]	1.0879	153.0° [23]	1.5709	28.4° [105]	
26.5 [80]	264 [106]	0.9181	131.1° [26]	1.5649	25° [91]	
26–26.5 [98,112]	262–264 [40]	1.1264	107.9° [23]	1.5697	25° [59]	21,432.0 [34]
26.4 [2,41]	263 [88,108]	0.9443	100° [49]	1.57390	25° [7]	
26.3 [15,27]	262–263 [80,84]	0.94402	99° [71]	1.5745	25° [73]	
26.1 [64,93]	262 [11,75,76,100]	0.9844	D_{95}^{95} [71]	1.5782	25° [67]	
26(b)	261–262(c)			1.57884	16.8° [2]	
25–26 [6,81,83,87,107]	260–262 [18,32,51]	0.9851	D_{90}^{90} [71]	1.56957	16° [44]	
25.64 [62]	261.5 [50]	0.9860	D_{85}^{85} [71]	1.51975	$n_{H\alpha}^{131.1}$ [26]	
25.6 [27]	261 [24,59,67,77,104]			1.53474	$n_{H\alpha}^{99.0}$ [71]	
25.5 [13,61,96]	260–261 [44,97,107]	0.9870	D_{80}^{80} [71]	1.54655	$n_{H\alpha}^{75.7}$ [26]	
25–25.5 [36]	259–261 [87]	1.1519	75.9° [23]	1.56954	$n_{H\alpha}^{26}$ [26]	
25.2 [38,69]	260 [20,29,43]	0.9626	75.7° [26]	1.57145	$n_{H\alpha}^{20.0}$ [95]	
25.09 ± 0.01 [19]	258–260 [92]	0.9881	D_{75}^{75} [71]	1.57304	$n_{H\alpha}^{16.8}$ [2]	
25 [30,31]	259 [57,58]			1.57653	$n_{H\alpha}^{11}$ [26]	
24–25 [68,102,111]	258–259 [91]	0.9893	D_{70}^{70} [71]	1.53839	$n_{H\beta}^{131.1}$ [26]	
24.8 [35,42]	262.3 766 [2]	0.9906	D_{65}^{65} [71]	1.55390	$n_{H\beta}^{99.0}$ [71]	
24.68 [70]	261.0			1.56616	$n_{H\beta}^{75.7}$ [26]	
24.5 [3,86]	−261.8 745 [60]	0.9919	D_{60}^{60} [71]	1.59002	$n_{H\beta}^{26}$ [26]	
24–24.5 [92]	250.0 551.5 [17]	0.9746	59.0° [63]	1.59183	$n_{H\beta}^{20.0}$ [95]	
24.45 [70]	217.0 240.1 [17]	0.9934	D_{55}^{55} [71]	1.59390	$n_{H\beta}^{16.8}$ [2]	
24.0 [46]	175.4–175.5 72 [53]	1.1724	54.3° [23]	1.59730	$n_{H\beta}^{11}$ [26]	
24 [28,90,94]	158 35 [44]	0.9950	D_{50}^{50} [71]	1.56615	$n_{H\gamma}^{99.0}$ [71]	
	141 27 [44]	0.9967	D_{45}^{45} [71]	1.60483	$n_{H\gamma}^{20.0}$ [95]	
	138–143 24 [10]	1.1806	43.59° [8]	1.61731	$n_{H\gamma}^{16.8}$ [2]	
	134 21 [105]	0.9987	D_{40}^{40} [71]		(e)	
	133–135 16 [95]	1.1851	39.24° [8]			
	142–144 15 [84]	1.1876	37.43° [8]			
	128–131 12 [10]	1.1893	35.20° [8]			
	128–129 11 [65]	1.0009	D_{35}^{35} [71]			
	125–128 10 [88]					
	117–118 9 [42]	1.0032	D_{30}^{30} [71]			
	90–91 4 [86]					

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Diphenylmethane (*Continued*)	99–102 1 [28]	1.1962 29.27° [8] 1.1983 27.15° [8] 1.0008 26° [26] 1.2016 25.01° [8] 1.0000 25° [67] 1.0024 25° [73] 1.0043 25° [59] 1.0056 D_{25}^{25} [71] 1.2037 23.20° [8] 1.2058 21.07° [8] 1.006 D_{20}^{20} [55] 1.2076 19.41° [8] 1.3333 17.79° (solid) [8] 1.00790 16.8° [2] 1.0126 11° [26] 1.3421 10.18° (solid) [8] (d)		*

$$* \frac{dD}{dt} = -0.0007539[1+0.0009326(t-20)]/°C \qquad (10 \text{ to } 131°C)$$

(a) The melting point 27 is found in references 1, 4, 9, 11, 22, 27, 37, 74, 75, 76, 77, 78, 106.
(b) The melting point 26 is found in references 10, 12, 14, 21, 24, 39, 45, 48, 49, 52, 56, 57, 58, 82, 88, 89, 99, 103, 104.
(c) The boiling point 261-262 is found in references 5, 7, 16, 22, 101, 110, 111.
(d) The densities on this compound fall into two distinct and widely separated ranges. The bold face value is calculated on the lower range since it contains more data.
(e) Refractive indices at other lines may be found in reference 71.

Diphenylmethane References

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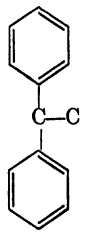
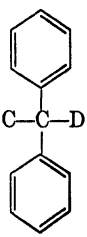
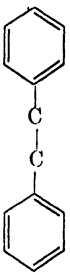
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Diphenylethane 				
	268.8			
	270–272 [134,135]	0.9875 [170]	1.5761 [168]	
	268–271 [60]	0.9997 [148]	1.5702 25° [149]	
	268–270 [73,80,123]	1.001 [174]	1.573 21° [134,135]	
	268–269 [6,170]	1.0039 [64]	1.5755 14° [80]	
	267–269 [149]	0.9877 25° [79]	1.56837 $n_{H\alpha}^{20}$ [174]	
	148 22 [79]	0.9998 25° [64]	1.58776 $n_{H\beta}^{20}$ [174]	
	148–153 20 [58]	1.006 21° [135]	1.57380 n_{He}^{20} [174]	
	150 20 [174]	1.006 D_0^{21} [134]		
	150 16 [5,7]	1.006 14° [80]		
	148 15 [148]			
	147 15 [1]			
	143–144 15 [142]			
	143 15 [16]			
	145 13 [7]			
	137–138 12.5 [20]			
	136 12 5 [145]			
	136 12 [80,164]			
	131–132 11 [98]			
	130–133 10 [169]			
	128–129 8 [2]			
Methyldiphenylmethane-d 				
	136–137 12 [20]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}		n_D^{20}		Additional Data
1,2-Diphenylethane (Dibenzyl) 						
52.0	**284.7**	**0.9661**	**50°**			Crit. Temp., (°C)
53.6 [61]	286.3 [82]	0.8438	210.2° [41]	1.5704	25° [128]	492 [161]
53.4 [99]	285 [54]	0.867	178° [86]	1.53385	$n_{H\alpha}^{80.6}$ [47]	
52.5–53.2 [162]	284–285 [71]	0.8828	158.8° [41]	1.55257	$n_{H\beta}^{80.6}$ [47]	
53.0 [46,75]	284.9 [88]	0.891	147° [86]			
53(a)	284(e)	0.913	120° [86]			
52.5–53 [1,28,143]	283–284 [69]	0.9212	107.8° [41]			
52–53 [3,66,169]	283 [87]	0.9283	100° [46]			
52.5 [90,91,120,134,137,155]	281–282 [121]	0.939	85° [86]			
52–52.5 [6]	281–282 758 [33]	0.9416	80.6° [47]			
51.5–52.5 [27,34]	276–278 756 [104]	0.9454	75.7° [41]			
52.3 [140]	240.1 250 [82]	0.9713	D_{75}^{75} [121]			
52.21 [15]	205.7 100 [82]	0.9725	D_{70}^{70} [121]			
52.0 [11,29]	170 17 [7]	1.0254	68.83° [15]			
52(b)	150–155 17 [37]	1.0283	65.63° [15]			
51.5–52 [30,56,96,97]	150–155 11 [124]	0.9738	D_{65}^{65} [121]			
51–52(c)	158 10 [126]	1.0319	62.32° [15]			
51.8 [19,163]	135 10 [145]	1.0324	60.71° [15]			
51.65 [56]		0.9581	60° [46]			
51.5 [4,7,156]		0.9752	D_{60}^{60} [121]			
51.4 [119,121]		1.0342	58.63° [15]			
51.3 [10,48,56,87]		0.958	58° [86]			
51.25 [89]		1.0371	55.23° [15]			
51.2 [48]		0.9766	D_{55}^{55} [121]			
51.0 [70]		1.0140	$D_{13}^{53.0}$ [11]			
51(d)		1.0423	52.3° [140]			
50–51 [3,53,146]		1.0401	52.21° [15]			
50.8 [94]		1.0421	50.12° [15]			
50.5 [9,43]		0.9655	50° [46]			
50 [59,92,145,151,165]		0.9782	D_{50}^{50} [121]			
		1.0452	46.79° [15]			
		1.1011 ± 0.0015	46° [130]			
		1.0495	42.61° [15]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^0	Additional Data
1,2-Diphenylethane (*Continued*)		0.9876 25° [128] 1.1772 16.00° (solid) [15] 1.1811 12.21° (solid) [15] 1.1865 3.85° (solid) [15] 1.0027 0° [46] 1.104 0° [175] 1.100(f) [12] 1.105(f) [65,129] 1.110(f) (solid) [105] (g)		*

$$* \frac{dD}{dt} = -0.0007643[1+0.00001317(t-50)]/°C \qquad (0 \text{ to } 210°C)$$

(a) The melting point 53 is found in references 22, 25, 35, 110, 131, 157, 158, 171.
(b) The melting point 52 is found in references 7, 8, 13, 14, 17, 21, 23, 24, 26, 31, 32, 33, 40, 42, 45, 49, 50, 52, 54, 57, 63, 67, 68, 69, 72, 76, 77, 78, 81, 85, 86, 93, 95, 101, 102, 103, 109, 111, 113, 116, 118, 122, 124, 125, 127, 129, 133, 138, 139, 147, 150, 152, 153, 154, 159, 160, 166, 167, 172.
(c) The melting point 51-52 is found in references 38, 44, 83, 100, 107, 112, 141.
(d) The melting point 51 is found in references 7, 18, 36, 39, 51, 55, 106, 108, 114, 115, 117, 126, 132, 134, 135.
(e) The boiling point 284 is found in references 7, 27, 74, 84, 103, 134, 135, 136, 137, 144, 157, 158, 161, 173.
(f) The temperature for this density is not given.
(g) The densities on this compound fall into two distinct and widely separated ranges. The bold face value is calculated on the lower range since it contains more data.

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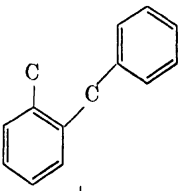
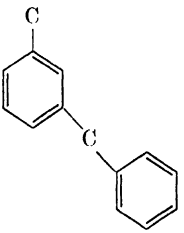
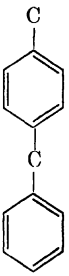
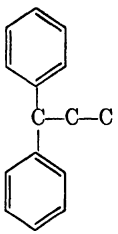
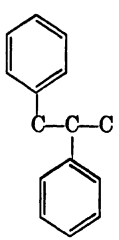
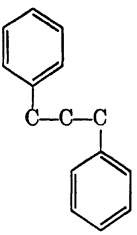
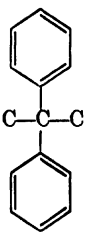
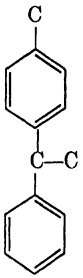
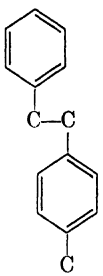
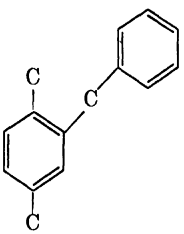
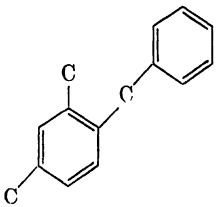
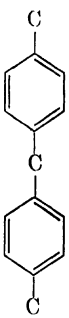
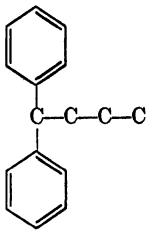
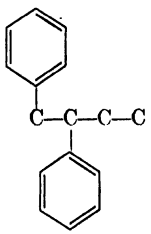
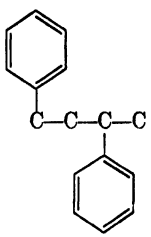
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-2-benzylbenzene 				
	275–280 [38] 279–282 [76] 148–158 16 [76]			
1-Methyl-3-benzylbenzene 				
	274–276 [51] 275 747 [106] 268 -269.5 725 [1] 120(a) 0.2 [135] 128(a) 0.11 [135]	0.997 17.5° [106]		
(a) These boiling points represent two different preparations.				
1-Methyl-4-benzylbenzene 				
	278.7			
	279–280 [57,63,136]	0.9976 [44]	1.5712 [44]	
	278–280 [6,130]	0.9978 19.3° [127]	1.57103 19.3° [127]	
	279 [80]	0.994 18° [57]	1.56579 $n_{H\alpha}^{19.3}$ [127]	
	278 [95,99]	0.995 17.5° [143,144]	1.58571 $n_{H\beta}^{19.3}$ [127]	
	277 [144]		1.59804 $n_{H\gamma}^{19.3}$ [127]	
	279–280 761.5 [143]	0.9976 15.0° [42]		

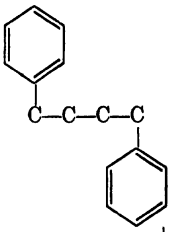
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-4-benzylbenzene (*Continued*)				
	271–272 750.2 [42]			
	153–154 16 [82]			
	144 16 [127]			
	159.5 15 [42]			
	145.5 –145.7 13.5 [147]			
	114–115 3 [44]			
	110 1 [32]			
$C_{15}H_{16}$				
1,1-Diphenylpropane 				
	278.5	0.990 [142]	1 569 24° [95,96]	
	–280.5 [95,96]	0 9998 [43]	1.5681 18.5° [59]	
	280 [142]	0.9962 25° [43]	1.56810 14.1° [142]	
	278–279 759 [139]	0.9881 D_0^{24} [95,96]	1.5657 14° [58]	
	278.5 –280.5 754 [59]	0.9938 18.5° [59]		
	153–154 20 [56]	0.9951 14.1° [142]		
	149–151 18 [12]	0.9919 14° [58]		
	140–141 13 [142]			
	140–142 11 [79]			
	139 11 [58]			
	142 10 [77]			
	139 10 [115]			
	129–131 7 [49]			
1,2-Diphenylpropane 				
52 [68]	280–282 [95,96]	0.9807 [139]	1.5700 [112]	
50 [129]	277–280 [141]	0.9812 [141]	1.5591 23.5° [59]	
	280–281 758 [59]	0.9809 23.5° [59]	1.555 23° [95,96]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Diphenylpropane (*Continued*)				
	278 751 [139]	0.9824 23° [56]		
	277–280 745 [50]	0.9953 0° [141]		
	166–167 28 [56]			
	155–157 22 [101]			
	145–148 13 [129]			
	147 10 [112]			
	109 2 [18]			
1,3-Diphenylpropane 				
	300.3			
6 [95]	301–303 [120]	1.007 [121]	1.5760 [59]	
	302 [95]	0.9930 25° [93]	1.5782 [93]	
	299–301 [8]	1.007 D_{20}^{20} [52]	1.5745 18° [52]	
	300 [81,98,99]		1.5712 17.5° [140]	
	299–300 [34]	1.0071 D_0^{20} [59]	1.5634 15° [111]	
	298–300 [111]	0.9982 17.5° [140]		
	297–300 [52]	0.9855 D_{15}^{15} [111]		
	298–299 758 [59]			
	163–167 21 [121]			
	166–168 16 [120]			
	155–157 12 [118]			
	124 2 [75]			
2,2-Diphenylpropane 				
29 [95,96]	282–283 [95,96]	0.9958 D_0^{25} [95,96]	1.570 25° [95,96]	
	282 [110]			
	281 [39,109]			

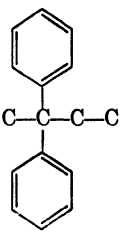
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-1-*p*-tolylethane 				
	154	0.9847 17.2° [126]	1.5646 [126]	
	−155.8 14 [126]	0.9849 16.9° [126]	1.56590 [126]	
	143–144 11 [78]		1.56038 $n_{H\alpha}^{17.2}$ [126]	
			1.57962 $n_{H\beta}^{17.2}$ [126]	
			1.59192 $n_{H\gamma}^{17.2}$ [126]	
1-Phenyl-2-*p*-tolylethane 				
27 [74]	286 [74]			
Benzylethylbenzene (a)				
	294–295 754 [132]	0.985 18.9° [132]		
(a) The structure of this compound is not given.				
1,4-Dimethyl-2-benzylbenzene 				
	294–295 [107]	0.9950 [107]		
	293.5			
	−294.5 [145]			

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,5-Dimethyl-2-benzylbenzene 	295–296 [146]			
Benzyl-1,2-dimethylbenzene (a)				
33–34 [107]	295–298 [107]			
(a) The position of the benzyl substitution is not given.				
Benzyl-1,3-dimethylbenzene (a)				
	293–298 [107]	0.9951 [107]		
(a) The position of the benzyl substitution is not given.				
Di-*p*-tolylmethane 				
28–29 [114] 28.5 [92] 28 [64]	301.5 773 [114] 302 768 [114] 165 12 [92]			
Ditolylmethane (a)				
	289–291 [85] 290 [35,134] 289 [65] 163–165 20 [108]	0.9800 [43] 0.9777 25° [43]		
(a) The structure of this compound is not given.				

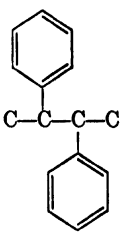
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Diphenylbutane 	286–288 [95,97] 265–266 751 [58] 178–179 20 [116] 161–163 20 [12] 170–175 15 [45] 160–162 12 [117] 148–152 12 [58] 140–142 11 [58] 150 10 [77] 103–104 0.05 [103]	0.9758 [103] 1.006 [58] 0.9748 D_0^{16} [95,97]	1.5577 [103] 1.554 16° [95,97] 1.577 16° [58]	
1,2-Diphenylbutane 	285–287 [95,97] 288–289 751 [58] 161 19 [11] 152 11 [58] 149–151 10 [115]	1.0092 D_0^{18} [95,97]	1.587 18° [95,97]	
1,3-Diphenylbutane 	295 [119]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Diphenylbutane 				
52				
52–53 [30]	317 [95,97,98,100,138]	0.9719 25° [93]	1.5493 25° [93]	
52(a)	315–317 [52]			
51–52 [137]				

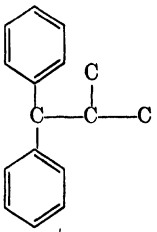
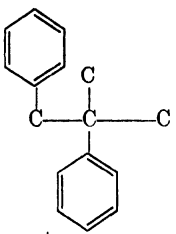
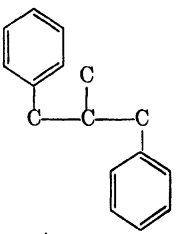
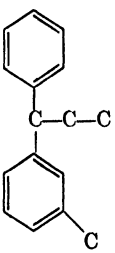
(a) The melting point 52 is found in references 7, 25, 29, 33, 46, 47, 48, 52, 53, 54, 62, 73, 95, 97, 98, 100, 124, 128, 138.

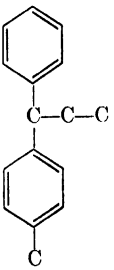
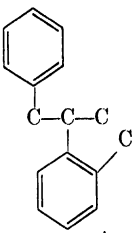
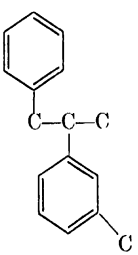
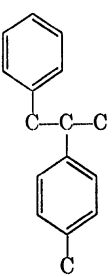
2,2-Diphenylbutane 				
127.5–128.5 [122]	152 10(a) [2]			

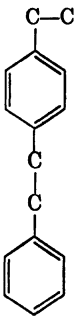
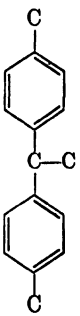
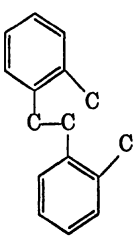
(a) This boiling point may be for 1,1-Diphenylbutane.

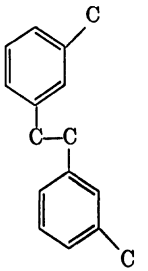
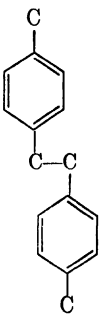
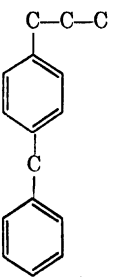
2,3-Diphenylbutane 				
124.4				
126–127(a) [26,87]	283–284 752(b) [67]	0.9756(b) [67]	1.55516(b) [67]	
126(a) [9,66,67]	162–164 25(b) [69]	0.9755 20.7° [125]	1.5594 [26]	
124–125 [23,26,88]	150–151 20 [26]	0.9906(b) 0° [67]	1.54964 $n_{H\alpha}^{20.7}$ [125]	
124 [15,55]	140 10(b) [67]	0.9917 D_0^{0} [26]	1.56734 $n_{H\beta}^{20.7}$ [125]	
123.5–124 [40]	103 1(b) [87]		1.57841 $n_{H\gamma}^{20.7}$ [125]	
123–124 [61,69]			1.55479 $n_{He}^{20.7}$ [125]	
123.5 [27,28,83,104,105]				
8(b) [66,67]				

(a) This constant was determined on the *meso* inactive form of the compound.
(b) This constant was determined on the *dl* form of the compound.

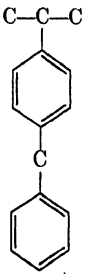
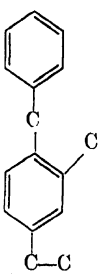
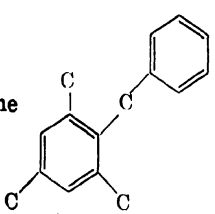
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Data Additional
1,1-Diphenyl-2-methylpropane 				
128 [2]	285–286 [95,97] 157 18 [102] 145 13 [2]	0.9780 D_0^{16} [95,97]	1.560 16° [95,97]	
1,2-Diphenyl-2-methylpropane 				
	284–287 750 [13]	0.984 15° [13]		
1,3-Diphenyl-2-methylpropane 				
	297–298 [96] 290–294 [123]			
1-Phenyl-1-*m*-tolylpropane 				
	143–144 17 [94]		1.5650 16° [94]	

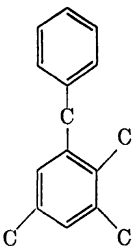
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-1-*p*-tolylpropane 	154–156 23 [94]		1.5683 [94]	
1-Phenyl-2-*o*-tolylpropane 	316–317 [60,133]			
1-Phenyl-2-*m*-tolylpropane 	311–312 [60,133] 240 110 [60]	0.987 15° [60]		
1-Phenyl-2-*p*-tolylpropane 	302–303 [60,133]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Ethyl-4-phenethylbenzene 	293–295 [113]			
1-Phenyl-1-ethylphenylethane (a)				
124 [89]				
(a) The position of the ethyl group is not given.				
1,1-Di-*p*-tolylethane 	293–295 723 [41] 155–157 12 [3] 144–145 8 [90]			
1,2-Di-*o*-tolylethane 				
66.5 [19,20,84] 65.5–66 [22] 65 [91]	177–178 20 [19,20]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Di-*m*-tolylethane 				
	298 [4]	0.9623 42° [24]	1.5566 22° [24]	
	296 [84]	0.9661 32° [24]		
	294–296 [36]	0.9703 22° [24]		
	163 10 [19,20,24]	0.9756 12° [24]		
		0.9796 5° [24]		
1,2-Di-*p*-tolylethane 				
82				
82–83 [19,20,21]	296–298 730 [31]			
82 [10,16,17,84,92]	178 18 [19,20]			
81–82 [4]				
81–81.5 [22]				
81 [5]				
1-*n*-Propyl-4-benzylbenzene 				
	152–155 10 [37]	0.9737 18° [37]	1.5552(a) [37]	

(a) It is not clear whether this refractive index is at 18° or 20°.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Isopropyl-4-benzylbenzene 	310 [57] 176 13 [57]	1.007 18° [57]		
1-Benzyl-2-methyl-4-ethylbenzene 	298–300 [72]	1.0141 11° [72]		
1,3,5-Trimethyl-2-benzylbenzene 	36 [14,57]	300–303 [57,70,71] 291–294 755 [86] 183 11 [57]		

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Benzyl-2,3,5-trimethylbenzene 	308–312 [57] 190–191 20 [57]	1.0151 18° [57]		

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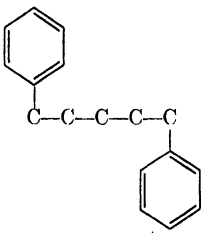
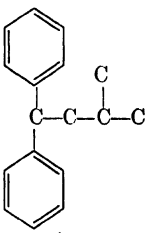
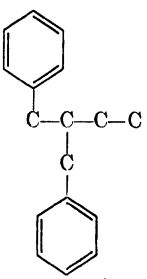
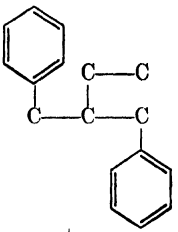
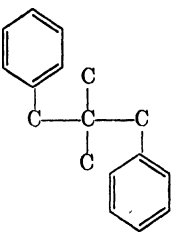
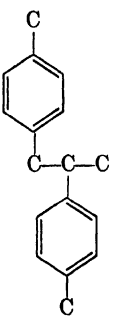
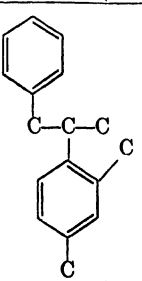
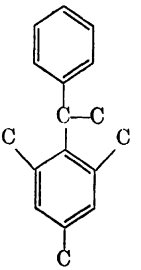
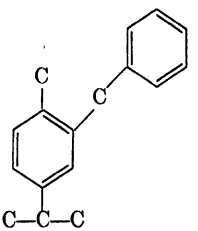
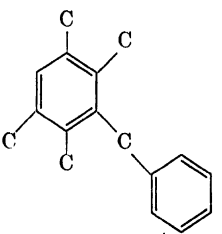
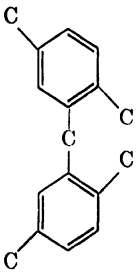
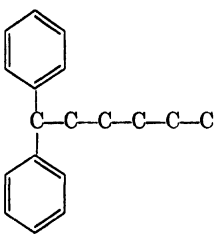
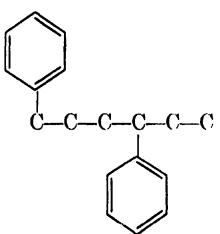
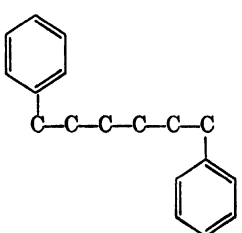
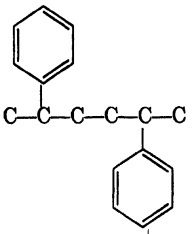
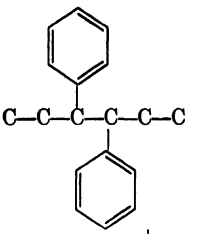
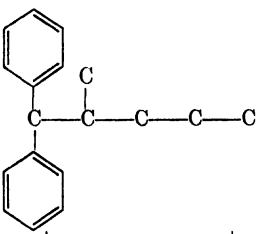
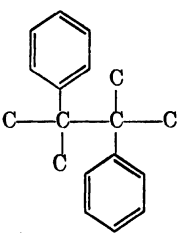
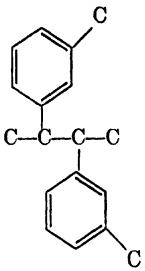
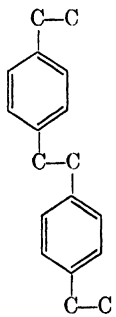
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,5-Diphenylpentane 	324 [58,59] 323–324 [31] 326–327 747 [15] 185 20 [67] 187–189 10 [11]	0.9601 25° [54] 0.9788 D_{20}^{20} [31] 0.9814 D_0^{19} [58,59] 0.985 13° [72] 0.9924 D_0^0 [58,59]	1.5582 [31] 1.5457 25° [54] 1.559 19° [58,59]	
1,1-Diphenyl-3-methylbutane 	297 [58,59]	0.9641 D_0^{21} [58,59] 0.9756 D_0^0 [59]	1.551 21° [58,59]	
1-Phenyl-2-benzylbutane 	166 16 [42]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3-Diphenyl-2-ethylpropane 	304–305 [58]	0.9736 D_0^{21} [58] 0.9855 D_0^{0} [58]	1.553 21° [58]	
1,3-Diphenyl-2,2-dimethylpropane 				
68–69 [68]	293–294 [68]			
1,2-Di-*p*-tolylpropane 	142–144 5 [29]	0.9726 [29]	1.5565 [29]	
1-Phenyl-2-(2′,4′-dimethylphenyl)-propane 	324 [36]			

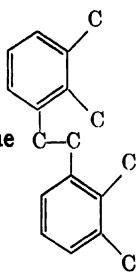
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-1-(2′,4′,6′-trimethylphenyl)-ethane 				
38–39 [23]				
1-Methyl-2-benzyl-4-isopropylbenzene 				
	296–297 [46] 296–297 743 [32] 176–177 17 [32] 165–167 12 [56]	0.9628 [56] 0.9690 15° [32] 0.98701 0° [46]	1.55638 [56] 1.55650 15° [32] 1.55138 $n_{H\alpha}^{15}$ [32] 1.56958 $n_{H\beta}^{15}$ [32] 1.58098 $n_{H\gamma}^{15}$ [32]	
1-Methylbenzyl-4-isopropylbenzene (a)				
	307–310 [64]	0.9916 [64]		
(a) The position of the benzyl substitution is not given.				
1,2,4,5-Tetramethyl-3-benzylbenzene 				
145 [4]	325–327 [4]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Di-2,5-dimethylphenylmethane 				
60–60.5 [30]	313–316 [30]			
$C_{18}H_{22}$				
1,1-Diphenylhexane 				
	164 10 [45]			
1,4-Diphenylhexane 				
89 [12]	147–149 3–4 [26] 147–148 3 [26]	0.9608 D_{20}^{20} [26] 0.9660 D_{20}^{20} [26]	1.5456 [26] 1.5460 [26]	
1,6-Diphenylhexane 				
137 [36] 29 [62]	206–208 20 [71] 140 0.05 [62]	0.9528 25° [54]	1.5380 25° [54]	

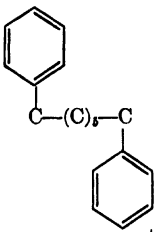
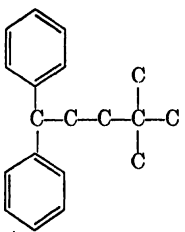
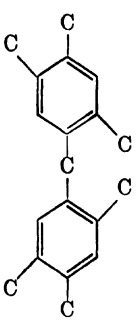
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,5-Diphenylhexane 	185 12 [19]	0.9634 15° [19]	1.5440 15° [19]	
3,4-Diphenylhexane 				
92–93 [66]	304–306 767 [41]	0.9591(a) [41]	1.54622(a) [41]	
92 [34]	297–298 767(a) [41]	0.9742(a) 0° [41]		
89.5–90.5 [27]	175 20 [34]			
90 [41]				
88 [48]				
(a) This compound is the *dl* modification and exists in liquid state at room temperature.				
1,1-Diphenyl-2-methylpentane 				
	160–161 14 [5]			
	163–164 13 [6]			
2,3-Dimethyl-2,3-diphenylbutane 				
55–56 [73]	138–140 15 [73]			
	162–165 14 [48]			

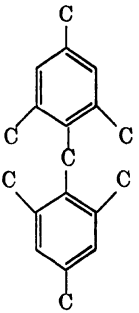
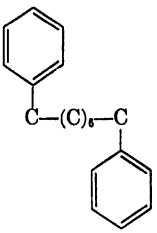
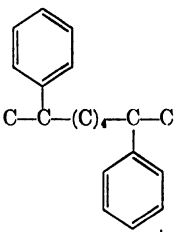
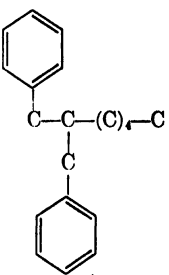
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,3-Di-*m*-tolylbutane 				
97 [69]				
1,2-Di-(4′-ethylphenyl)-ethane 				
69.8–70.2 [16]				
1,1-Di-*m*-Xylylethane (a)				
	323–325 [2]			

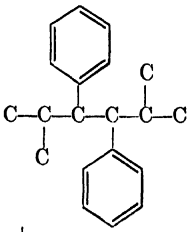
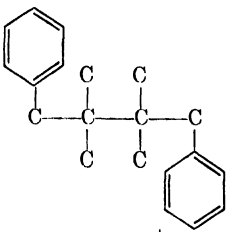
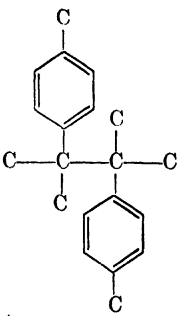
(a) The position of the methyl groups relative to the substitution of the phenyl group on the ethane is not given.

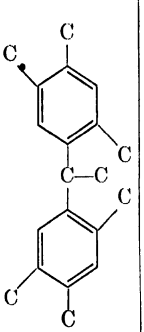
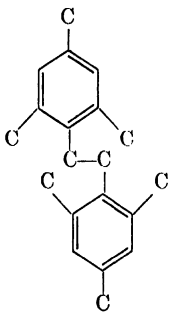
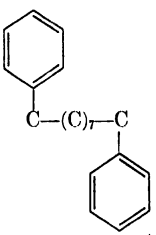
1,2-Di-(2′,3′-dimethylphenyl)-ethane 				
111–112 [62]				

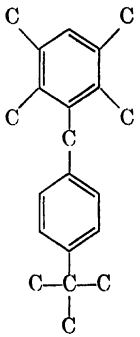
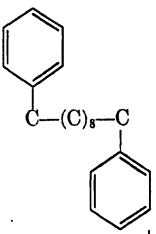
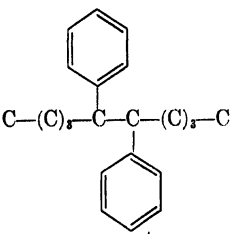
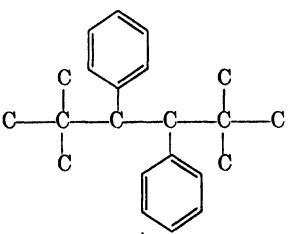
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Di-(3′,5′-dimethylphenyl)-ethane				
86–86.6 [16] 78 [13,14] 77–78 [48,76]	332 -332.5 763 [76] 210 15 [13,14]			
3,5-Dimethylphenyl-2′,4′,6′-trimethylphenylmethane				
67–68 [73,74,75]	328.5 -329 763 [76]			
$C_{19}H_{24}$				
1,1-Diphenylheptane				
14 [3,33,37]	333–334 751 [33] 193 15 [37] 190–192 13 [3,33] 186 10 [37] 180 10 [33]			

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,7-Diphenylheptane 	207–208 12 [11]			
1,1-Diphenyl-4,4-dimethylpentane 	122–127 1 [1] 114–116 0.65 to 0.70 [1]	0.9520 [1] 0.9522 [1]	1.5411 [1] 1.5418 [1]	
2,2-Dixylylpropane (a)				
174.5 [25]				
(a) The structure of this compound is not given.				
Di-2,4,5-trimethylphenylmethane 				
100 [80] 99 [70]	189–190 12 [70]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Di-2,4,6-trimethylphenylmethane 				
135 [35,78] 130 [50,70]				
$C_{20}H_{26}$ **1,8-Diphenyloctane** 				
10 [38]	215 12 [11] 208–210 8 [71]	0.9364 25° [54]	1.5298 25° [54]	
2,7-Diphenyloctane 				
	190–191 11 [67]			
1-Phenyl-2-benzylheptane 				
	135–136 [28] 7	0.9060 D_{20}^{20} [28]	1.48596 [28]	

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,5-Dimethyl-3,4-diphenylhexane  150–150.5 [17]				
1,4-Diphenyl-2,2,3,3-tetramethylbutane  131–132 [17]				
2,3-Dimethyl-2,3-di-*p*-tolylbutane  157 [7,8]				
1,1-Di-*n*-propyldiphenylethane (a)	192–194 42(b) [53] 244–248 37(b) [53]			
(a) The position of the propyl groups is not given. (b) These boiling points represent two different isomers.				
1,2-Di-*n*-propyldiphenylethane (a)				
97–98(b) [40]	178–179 13(c) [40]	0.9452(c) [40] 0.9596(c) 0° [40]	1.53663(c) [40]	
(a) The position of the propyl groups is not given. (b) This constant was determined on the *meso* form. (c) This constant was determined on the *dl* form.				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Diisopropyldiphenylethane (a)				
	240–245 15 [53]			
(a) The position of the isopropyl groups is not given.				
1,1-Di-(2′,4′,5′-trimethylphenyl)-ethane 				
126–127 [79]				
1,2-Di-(2′,4′,6′-trimethylphenyl)-ethane 				
117–118 [78]	344–348 [81]			
$C_{21}H_{28}$				
1,9-Diphenylnonane 				
	235 12 [11]			

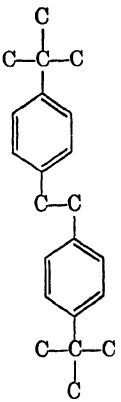
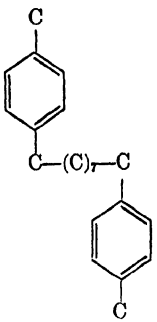
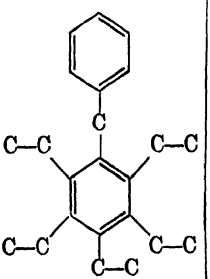
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,3,5,6-Tetramethylphenyl-4′-*tert*-butylphenylmethane 				
116–117 [24]				
$C_{22}H_{30}$ **1,10-Diphenyldecane** 				
17.5 [62] 16–17 [10] 16 [71]	234 12 [10] 224–225 9 [71] 169–170 0.03 [62]	0 9180 40° [62] 0.9232 30° [62]	1.5282 [62]	
5,6-Diphenyldecane 				
80 [17]				
2,2,5,5-Tetramethyl-3,4-diphenylhexane 				
185–186 [21] 180–181 [17]				

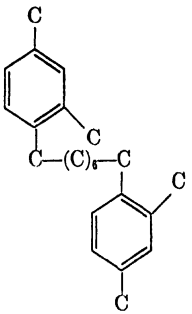
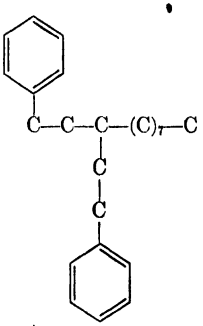
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,6-Di-(2′,4′-dimethylphenyl)-hexane				
76–77 [9]	247–248 20 [9]			
Di-1,4-(2′,4′,6′-trimethylphenyl)-butane				
124 [65] 123–124 [44]				
Di-*n*-butyldiphenylethane (a)				
79–79.5(b) [40]	183–184 10(c) [40]	0.9337(c) [40] 0.9490(c) 0° [40]	1.52857 [40]	

(a) The structure of this compound is not given.
(b) This constant was determined on the *meso* form.
(c) This constant was determined on the *dl* form.

1,1-Di-*sec*-butylphenylethane (a)				
	250–252 11 [63]			

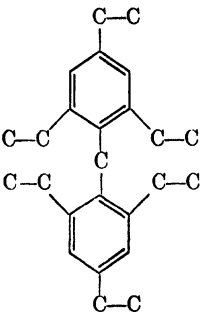
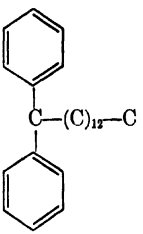
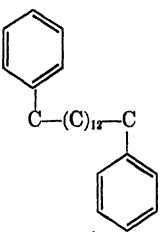
(a) The position of the butyl groups is not given.

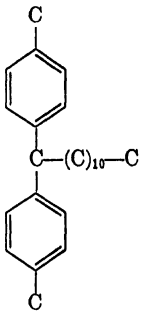
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Di-*tert*-butylphenylethane (a)				
94 [53]	212–214 16 [53]			
(a) The position of the butyl groups is not given.				
1,2-Di-(4′-*tert*-butylphenyl)-ethane 				
149 [46]				
$C_{23}H_{32}$ **1,9-Di-*p*-tolylnonane** 				
48–49 [9]	248–252 18 [9]			
Phenylpentaethylphenylmethane 				
88–89 [22]				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,8-Di-(2′,4′-dimethylphenyl)-octane 				
63–64 [9]	253–254 13 [9]			
Di-2,4,6-trimethylphenylhexane (a)				
74 [65]				
(a) The position of the trimethylphenyl substitutions is not given.				
1,1-Di-[x′-(3″-pentyl)-phenyl]-ethane (a)				
	234–236 29 [53]			
(a) The position of the pentyl groups is not given.				
$C_{25}H_{36}$				
1-Phenyl-3-phenethylundecane 				
		0.9215	**1.5192**	
−54 [60]				
	197.0 1.00 [60,61]	0.9211 [60,61]	1.5192 [60,61]	
	184 0.50 [61]	0.8689 98.9° [61]	1.5116 40.0° [61]	
		0.8948 60° [61]	1.5154 30.0° [61]	
		0.9093 37.8° [61]		
		0.9356 0° [61]		

* $\frac{dD}{dt} = -0.0006873[1 - 0.0008031(t-20)]/°C$ (0 to 99°C)

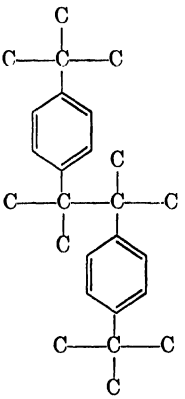
† $\frac{dn}{dt} = -0.000380/°C$ (20 to 40°C)

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Di-2,4,6-triethylphenylmethane 				
71–72 [49]				
$C_{26}H_{38}$				
1,1-Diphenyltetradecane 				
		*0.9187	1.5202	
17.9 [18,60,61]	207 1.00 [18,61]	0.9186 [18,60,61]	1.5202 [18,60,61]	
	194 0.5 [18]	0.8659 98.9° [18]	1.5123 40.0° [18]	
		0.8916 60° [18]	1.5162 30.0° [18]	
		0.9068 37.8° [18]		
* $\frac{dD}{dt} = -0.0006787[1-0.0003577(t-20)]/°C$ (20 to 99°C)				
† $\frac{dn}{dt} = -0.000395/°C$ (20 to 40°C)				
1,14-Diphenyltetradecane 				
	262–265 8 [71]			

M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1,1-Di-*p*-tolyldodecane 							*
			0.9117		**1.5001**		†
	197.0	1.00 [60]	0.9117 [60]		1.5001 [60]		
	183.0	0.50 [60]	0.8607	98.9° [60]	1.4927	40.0° [60]	
			0.8859	60° [60]	1.4964	30.0° [60]	
			0.9000	37.8° [60]			
			0.9248	0° [60]			

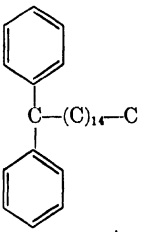
* $\frac{dD}{dt} = -0.0006514[1 - 0.0002067(t - 20)]/°C$ (0 to 99°C)

† $\frac{dn}{dt} = -0.000370/°C$ (20 to 40°C)

2,3-Dimethyl-2,3-di-(4′-*tert*-butylphenyl)-butane 							
225 [74]							

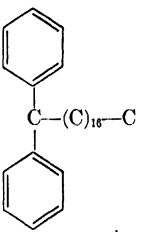
1,2-Di-*n*-hexyldiphenylethane (a)							
59(b) [40]	223		0.9174(c) [40]		1.51770(c) [40]		
	−224(c)	10 [40]	0.9310(c)	0° [40]			

(a) The position of the hexyl substitutions is not given.
(b) This constant was determined on the *meso* form.
(c) This constant was determined on the *dl* form.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Diphenylhexadecane 				*
		0.9130		
			1.5156 [63]	
26 [63]	279–281 15 [39]	0.9117 [63]	1.5121 25° [55]	
	273–275 10 [39]	0.9135 [39,55]	1.51569 16° [39]	
	211–213 0.1 [63]	0.8615 100° [20]	1.51209 $n_{H\alpha}^{16}$ [39]	
		0.8940 50° [20]	1.52508 $n_{H\beta}^{16}$ [39]	
		0.9265 0° [20]	1.53346 $n_{H\gamma}^{16}$ [39]	

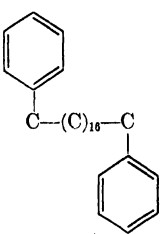
* $\frac{dD}{dt} = -0.0006538[1-0.0004246(t-20)]/°C$ (0 to 100°C)

$C_{30}H_{46}$

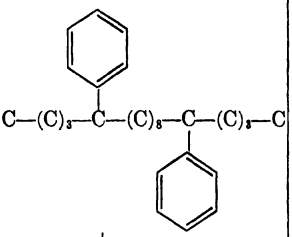
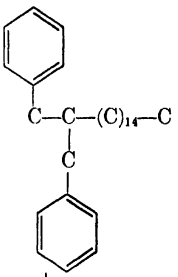
1,1-Diphenyloctadecane 

		0.9260(a) 25° [47]	1.5138 25° [47]	

(a) This density is an extrapolated value.

1,18-Diphenyloctadecane 

61 [62]				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
5,14-Diphenyloctadecane 				
		0.9051 25° [47]	1.5110 25° [47]	
1-Phenyl-2-benzylheptadecane 				
		0.9165		
34.5–35 [39]	294–296 16 [39]	0.9165 [39,55]	1.5123 25° [55]	
	287–289 10 [39]	0.8642 100° [20]	1.51596 15.9° [39]	
		0.8969 50° [20]	1.51218 $n_{H\alpha}^{15.9}$ [39]	
		0.9296 0° [20]	1.52536 $n_{H\beta}^{15.9}$ [39]	
			1.53373 $n_{H\gamma}^{15.9}$ [39]	
* $\frac{dD}{dt} = -0.0006539$/°C	(0 to 100°C)			

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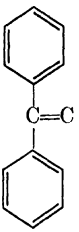
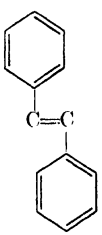
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Diphenylethene 				
	277			
8–9 [96,111] 8.2 [109] 7–9(a) [135]	277–280 [101,102] 277 [2,3,47] 276–277 [112] 274–276 [34,35] 164 34 [57] 156 30 [14] 156 25 [57] 155 25 [135] 152.5–154 19 [128] 147 16 [58] 148 15 [103] 139 11 [68] 134–134.5 10 [51] 134 10 [63] 123–125 5 [1] 113 2 [1] 94–95 1 [109]	1.0232 [128] 1.0253 25° [57] 1.028 D_0^{21} [101,102] 1.0278 18° [52] 1.0278 15° [96] 1.038 14° [58] 1.0415 0° [96]	1.6075 [103] 1.60849 [128] 1.6100 [51] 1.6035 30° [135] 1.606 21° [101,102] 1.6091_4 19° [30] 1.610 14° [58] 1.60089 $n_{H\alpha}^{20.0}$ [128] 1.6018_8 $n_{H\alpha}^{19}$ [30] 1.62730 $n_{H\beta}^{20.0}$ [128] 1.64482 $n_{H\gamma}^{20.0}$ [128]	
(a) This figure is given as a freezing point in the literature.				
***cis*-1,2-Diphenylethene** (*cis*-Stilbene) 				
	154–154.5 21 [33] 150 19 [106] 148–149 17 [15] 145 13 [104] 143 13 [108] 140.5–141 13 [23,93] 140 12 [20] 139–140 12 [22] 137 10 [127]	1.014 [127] 1.0143 [28] 1.014 24° [22] 1.020 16° [22] 1.0171 15.9° [126] 1.0183 15.9° [126] 1.023 13° [22]	1.6083 [28] 1.6032 25° [66] 1.620 13° [22] 1.60454 $n_{H\alpha}^{15.9}$ [126] 1.60526 $n_{H\alpha}^{15.9}$ [126] 1.63385 $n_{H\beta}^{15.9}$ [126] 1.63527 $n_{H\beta}^{15.9}$ [126]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
***cis*-1,2-Diphenylethene** (*cis*-Stilbene) (*Continued*)			1.65609 $n_{H\gamma}^{15.9}$ [126] 1.6220 n_{He}^{20} [127] 1.61277 $n_{He}^{15.9}$ [126] 1.61367 $n_{He}^{15.9}$ [126]	
	136–137 10 [116] 134 10 [121,122] 133 8 [28] 132 1 [118] 92 0.1 [81]			
***trans*-1,2-Diphenylethene** (*trans*-Stilbene)				
124.2	**306.5**			
124.5–125.5 [25]	307 [105]	1.039 [127]	1.62179 $n_{H\alpha}^{21.7}$ [129]	
125.0 [125]	306–307 [137,138]	0.9544 125° [124]	1.62213 $n_{H\alpha}^{19.9}$ [129]	
125(a)	306.5 [62]	0.9703 125.0° [11]	1.65474 $n_{H\beta}^{21.7}$ [129]	
124–125(b)	302–304 [72]	0.9707 125.0° [11]	1.65506 $n_{H\beta}^{19.9}$ [129]	
124.5–124.8 [109]	305.0	1.0883 21.7° [129]	1.63108 $n_{He}^{21.7}$ [129]	
124–124.5 [113]	−307.5 744 [70]	1.0888 19.9° [129]	1.6820 n_{He}^{20} [127]	
124.4 [39]	305 720 [61]	1.164 0° [145]	1.63134 $n_{He}^{19.9}$ [129]	
124.2 [89]	168 13 [23]	1.155 (solid) [74]		
124.0 [11]	167 12 [127]	1.156(e) [12]		
124(c)	166–167 12 [22,137]	1.159(e) [46]		
123–124(d)				
123.5 [17,90,124]				
123 [94,95,131,141]				
121–123 [38]				
122 [118]				
121–122 [10]				
121 [13,36,97]				

(a) The melting point 125 is found in references 40, 48, 55, 64, 67, 71, 104, 108, 119, 142.
(b) The melting point 124-125 is found in references 16, 21, 80, 114, 133, 134, 136, 139.
(c) The melting point 124 is found in references 4, 5, 6, 7, 8, 9, 19, 22, 24, 26, 27, 29, 31, 32, 33, 37, 41, 42, 43, 44, 45, 49, 50, 53, 54, 56, 59, 60, 61, 73, 75, 76, 79, 82, 83, 84, 85, 86, 87, 88, 91, 92, 98, 99, 100, 106, 107, 110, 115, 117, 120, 122, 127, 129, 132, 137, 138, 140, 143, 144.
(d) The melting points 123–124 is found in references 18, 65, 69, 72, 77, 78, 81, 116, 123, 130.
(e) The temperature for this density is not given.

Diphenylethene References

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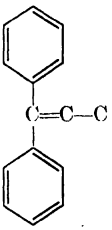
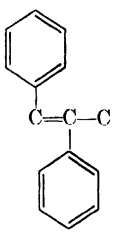
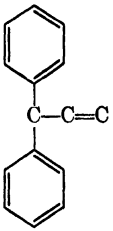
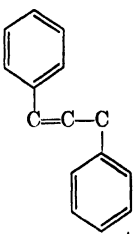
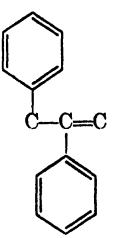
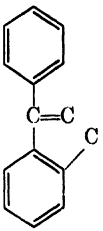
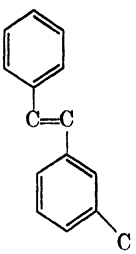
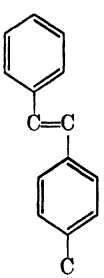
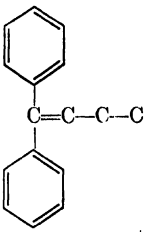
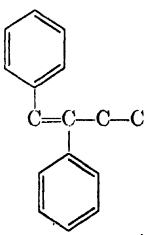
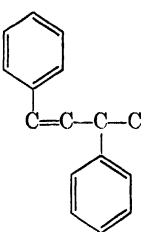
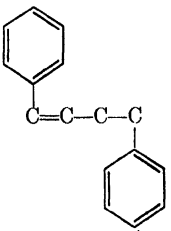
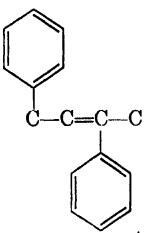
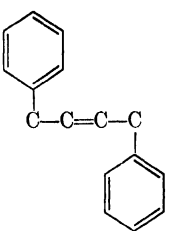
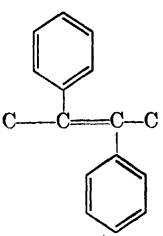
M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1,1-Diphenylpropene-1 							*
51			**1.0096**				
52 [5,32,38]	284.5 [66,67]		0.9710	78.2° [88]	1.57913	63.5° [90]	
51–52 [88]	280–281 [56]		0.9813	63.5° [90]	1.5815	60° [39]	
51.5 [66,67]	182–184	34 [90]	0.9841	60° [39]	1.593	23° [66,67]	
51 [43,56]	169–170	28 [5,38]	1.0076	D_0^{23} [66,67]	1.56534	$n_{H\alpha}^{78.2}$ [88]	
50.5–51 [35]	149	11 [39]	1.127	0° [102]	1.57197	$n_{H\alpha}^{63.5}$ [90]	
50–50.5 [90]					1.58958	$n_{H\beta}^{78.2}$ [88]	
48–49 [97,98]					1.59638	$n_{H\beta}^{63.5}$ [90]	
48.5 [72]					1.61169	$n_{H\gamma}^{63.5}$ [90]	
					1.57329	$n_{He}^{78.2}$ [88]	
* $\frac{dD}{dt} = -0.0006542$/°C	(20 to 60°C)						
1,2-Diphenylpropene-1 							
82							
83 [52,70]	285–286 [39]		0.9565	99.9° [92]	1.5635	17° [39]	
82–83 [18,31,38,47,64,92]	285 [66]		0.9857	17° [39]	1.58358	$n_{H\alpha}^{99.9}$ [92]	
82 [34,37,50,66,67,82]	183	26 [38]			1.61469	$n_{H\beta}^{99.9}$ [92]	
81–82 [84]	167(b)	24 [70]			1.59180	$n_{He}^{99.9}$ [92]	
80–81.5 [20]	176–180	19 [84]					
81 [19,93,95]	165	13 [92]					
80–81 [83]	162–165	13 [64]					
48(a) [18]							

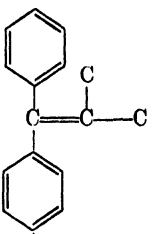
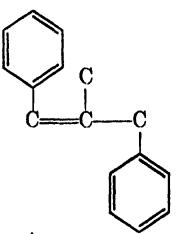
(a) This constant was probably determined on the *cis* isomer.
(b) This constant was determined on the *cis-trans* isomer.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Diphenylpropene-2 	293 [48] 279–281 [66,67] 94 14 [63]	1.0038 D_D^{24} [66,67] 0.8886 21° [63]	1.596 [48] 1.587 24° [66,67] 1.5337 21° [63]	
1,3-Diphenylpropene-1 				
57 [24] 15–16 [80]	276 [24] 175–176 17 [46] 174–175 16 [20] 171–173 16 [5] 178–179 15 [15] 178–179 14 [80] 174–175 12 [74] 164 12 [57] 164–168 11 [9] 170 10 [7]	1.012 19.5° [20] 1.0003 17° [9]	1.5949 19.5° [20] 1.6010 17.5° [9]	
1,2-Diphenylpropene-2 				
48 [57]	289 757 [57] 140–143 0 [94]	1.10143 [94]	1.5903 [94]	

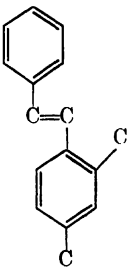
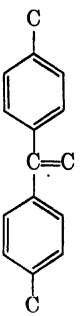
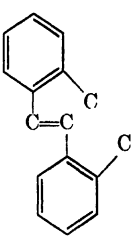
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-1-*o*-tolylethene 	145–146 13 [6]			
1-Phenyl-2-*m*-tolylethene 				
52.5–53.5 [91]	206–207 30 [91]	1.026 [42] 0.9891 60.5° [91]	1.655 [42] 1.63628 60.5° [91] 1.62501 $n_{H\alpha}^{60.5}$ [91] 1.66983 $n_{H\beta}^{60.5}$ [91]	
1-Phenyl-2-*p*-tolylethene 				
119.5				
120 [1]	192 30 [40]			
119–120 [64]	175–180 17 [64]			
119.6 [62]	160–161 11 [64]			
117 [40,58,75]	145–146 6 [64]			

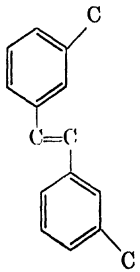
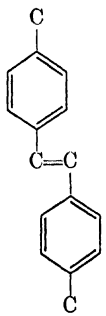
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Diphenylbutene-1 	295–297 [66,68] 291–292 [56] 286 750 [39] 154 20 [39] 157–158 14 [70] 158–159 13 [5] 108–110 0.4 [71]	0.9937 [71] 1.030 18° [39] 1.0039 D_0^{16} [66,68]	1.5904 [71] 1.5915 18° [39] 1.595 16° [66,68]	
1,2-Diphenylbutene-1 	296–297 [39] 296 [68] 294–296 [66] 162–167 12–14 [78]	1.0124 D_0^{18} [66,68]	1.593 18° [66,68]	
1,3-Diphenylbutene-1 	312 [76,77] 175–176 14 [79]		1.590 [79]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Diphenylbutene-1 				
124 [77,86] 39 [25]	310–312 [22] 310 [41]	1.016 15° [22] 1.027 0° [22]		
$C_{16}H_{16}$ **1,3-Diphenylbutene-2** 				
	169–170 12 [79]	1.0149 20.6° [79]		
1,4-Diphenylbutene-2 				
45–45.5 [51,81,101]	73 14 [81]			
***cis*-2,3-Diphenylbutene-2** 				
66				
66–67 [36] 66 [60,89] 65–66 [65] 64–66 [87]		1.004 [89] 0.9537 77.8° [87]	1.55466 $n_{H\alpha}^{77.8}$ [87] 1.57742 $n_{H\beta}^{77.8}$ [87] 1.56116 $n_{H\gamma}^{77.8}$ [87] 1.5919 n_{He}^{20} [89]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
***trans*-2,3-Diphenylbutene-2**				
106.5 108 [65] 107 [60,67,89] 105 [36,69] 104–105 [44,45]	156–158 16 [69]	0.987 [89]	1.6173 n_{He}^{20} [89]	
1,1-Diphenyl-2-methylpropene-1 				
11–11.5 [100] 11.2–11.3 [23]	293 [66,68] 280–282 775 [44] 150–152 15 [65] 152–154 14 [88] 152–153 14 [69] 146–147 12 [99] 145.5 –146.0 10 [23]	1.000 [88] 1.0021 17.6° [88] 1.0240 D_0^{16} [66,68] 1.010 0° [44]	1.596 16° [66,68] 1.58167 $n_{H\alpha}^{17.6}$ [88] 1.60512 $n_{H\beta}^{17.6}$ [88] 1.62055 $n_{H\gamma}^{17.6}$ [88] 1.5875 n_{He}^{20} [88] 1.58855 $n_{He}^{17.6}$ [88]	
1,3-Diphenyl-2-methylpropene-1 				
	315 [49] 304 [66,68] 188–189 25 [88] 175–177 20 [49]	1.0181 D_0^{16} [66,68] 1.037 0° [49]	1.587 18° [49] 1.593 16° [66,68]	
1-Phenyl-2-ethylphenylethene (a)				
89–90 [73]				

(a) The position of the ethyl group is not given.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-2-(2′,4′-dimethylphenyl)-ethene 				
40–41 [28]				
1,1-Di-*p*-tolylethene 				
61–62 [21] 61 [2,8]	163–165 13 [2]			
1,2-Di-*o*-tolylethene 				
82.5–83.0 [96] 82–83 [75]				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Di-*m*-tolyethene 				
55–56 [4]	134–139 5 [55] 118 3 [55]	1.0003 [55]	1.5922 [55]	
1,2-Di-*p*-tolylethene 				
178				
181 [61] 179–180 [59,96] 179 [8,10] 178 [11,75] 177–178 [33] 177 [12,13,16,17,30] 176–177 [4,14,27,58]	304–305 [16]			

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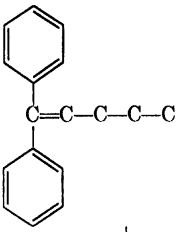
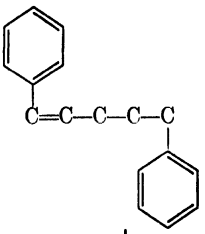
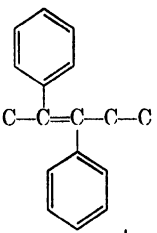
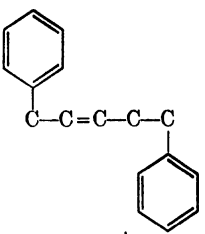
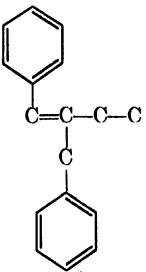
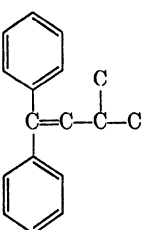
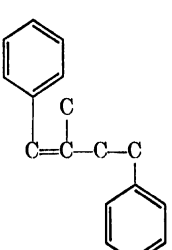
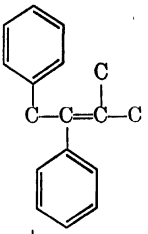
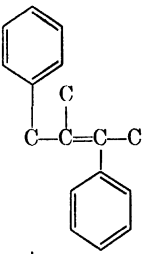
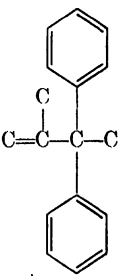
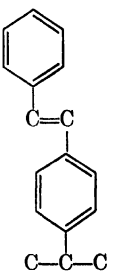
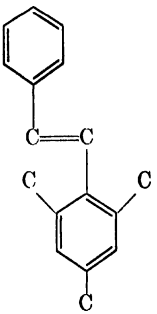
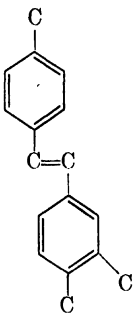
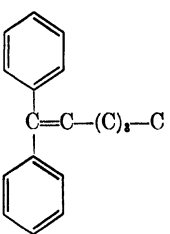
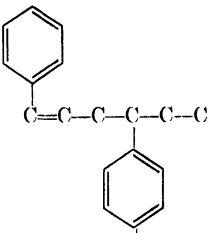
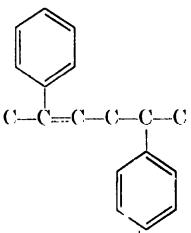
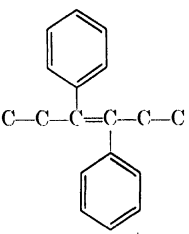
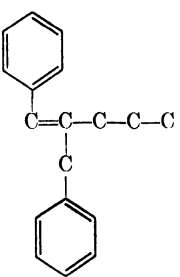
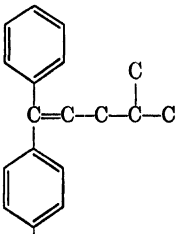
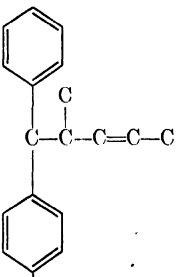
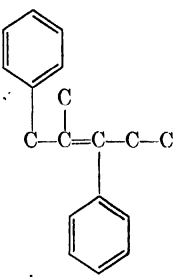
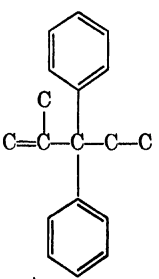
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Diphenylpentene-1 	174–175 14 [43] 170 13 [20]	1.0139 0° [20]	1.57768 15° [20]	
1,5-Diphenylpentene-1 	186 11 [8]			
2,3-Diphenylpentene-2 	297–299 [28] 297–299 765 [22]	1.040 0° [22]		
1,5-Diphenylpentene-2 	184–185 10 [8]			

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-2-benzylbutene-1 	304–305 [40] 177–178 15 [7] 183–185 14 [24]	0.9736 D_0^{21} [40] 1.012 0° [24] 0.9855 D_0^{0} [40]	1.553 21° [40] 1.5785 18° [24]	
1,1-Diphenyl-3-methylbutene-1 	298–299 [39,40] 296–299 [41] 169–170 20 [20] 166–168 18 [49]	0.978 [49] 0.9792 D_0^{21} [39,40] 0.9813 17.0° [49] 0.9946 0° [20]	1.581 21° [39,40] 1.5754 15° [20] 1.57015 $n_{H\alpha}^{17.0}$ [49] 1.59269 $n_{H\beta}^{17.0}$ [49] 1.60724 $n_{H\gamma}^{17.0}$ [49] 1.5753 n_{He}^{20} [49] 1.57667 $n_{He}^{17.0}$ [49]	
1,4-Diphenyl-2-methylbutene-1 	205-206 40 [30]			

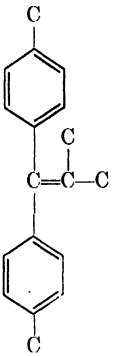
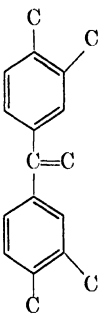
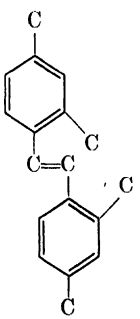
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Diphenyl-3-methylbutene-2 	176–178 26 [19] 170–172 20 [1] 168 20 [1] 150 10 [19]		1.5632 24° [19]	
1,3-Diphenyl-2-methylbutene-2 	176–177 20 [1]			
2-Methyl-3,3-diphenylbutene-1 	132–133 4.5 [2]	1.0060 [2]	1.5757 [2]	
1-Phenyl-2-(4′-isopropylphenyl)-ethene 				
86 [55] 85 [12] 84 [18] 83–84 [27]				

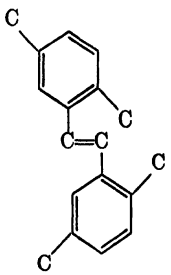
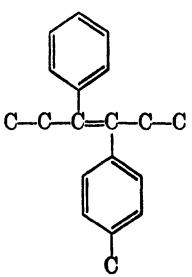
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-2-(2′,4′,6′-trimethylphenyl)-ethene 				
55–56 [14]				
1-*p*-Tolyl-2-(3′,4′-dimethylphenyl)-ethene 				
120–121 [47]				
$C_{18}H_{20}$				
1,1-Diphenylhexene-1 				
73 [33]	314 [26] 188 18 [20] 184 15 [43]			

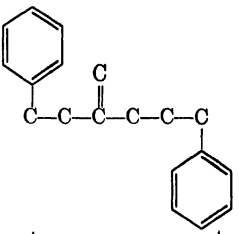
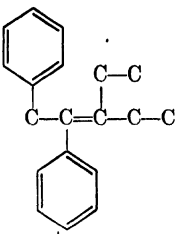
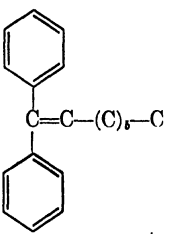
M. P., °C	B. P., °C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1,4-Diphenylhexene-1 							
	217–219	30 [52]	0.9915 [37,50]		1.58800 [37,50]		
	190–191	11 [51]	0.9892	21.8° [51]	1.58749	22.8° [51]	
	190	11 [37,50]			1.58083	$n_{H\alpha}^{22.8}$ [51]	
					1.60490	$n_{H\beta}^{22.8}$ [51]	
					1.62049	$n_{H\gamma}^{22.8}$ [51]	
2,5-Diphenylhexene-2 							
	302 [16]		0.9724	21° [16]			
	175	16 [48]	1.012	0° [48]			
3,4-Diphenylhexene-3 							
76 [54]	168	14 [35,36]					
	165	14 [54]					
1-Phenyl-2-benzylpentene-1 							
	315–317 [24]		0.9775 [24]		1.57	18° [24]	

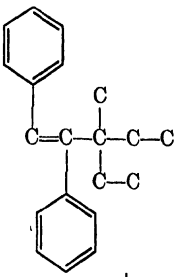
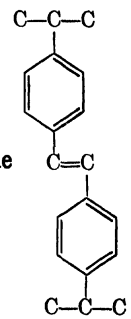
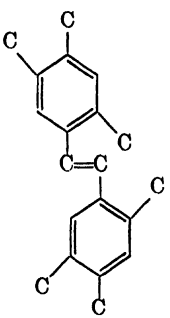
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Diphenyl-4-methylpentene-1 	178–180 17 [20] 178 16 [45]	0.9725 25° [45] 0.9907 0° [45]	1.57463 17.8° [45]	
1,1-Diphenyl-2-methylpentene-3 	174 20 [3] 153–154 14 [3]			
1,3-Diphenyl-2-methylpentene-2 	178–180 18 [1]			
2-Methyl-3,3-diphenylpentene-1 	175–177 16 [1]			

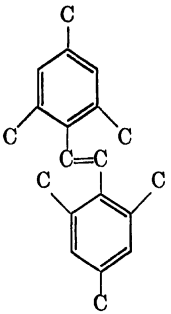
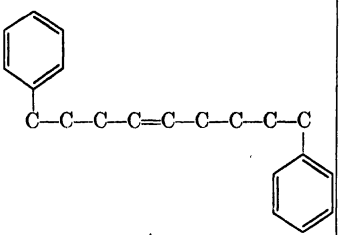
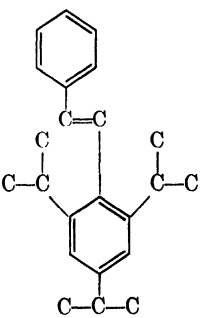
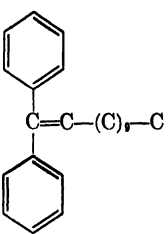
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,4-Diphenyl-4-methylpentene-2	170–171 17 [4]			
1-Phenyl-2-benzyl-3-methylbutene-1	315–317 [24]		1.571 18° [24]	
1,1-Diphenyl-2-ethylbutene-1	160 11 [35,36]			
1,2-Diphenyl-3,3-dimethylbutene-1	164–165 11 [24]			
48–49 [34]				

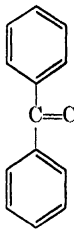
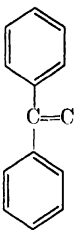
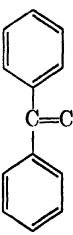
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Di-*p*-tolyl-2-methylpropene-1				
50 [43]				
1,2-Di-(ethylphenyl)-ethene (a)				
134.5 [15]				
(a) The position of the ethy l groups is not given.				
1,1-Di-(3′,4′-dimethylphenyl)-ethene				
73–74 [6]				
1,2-Di-(2′,4′-dimethylphenyl)-ethene				
125.5–126(a) [29] 106 [11] 105–106 [15]				

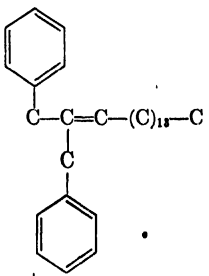
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Di-(2′,4′-dimethylphenyl)-ethene (*Continued*)				
105 [10]				
104–105 [47]				
65–65.5(b) [29]				
(a) This constant was determined on the *cis* isomer. (b) This constant was determined on the *trans* isomer.				
1,2-Di-(2′,5′-dimethylphenyl)-ethene 				
157 [5,10,16]				
$C_{19}H_{22}$				
1,1-Diphenyl-*n*-heptene (a)				
		0.9673 18° [17]	1.5648 18° [17]	
(a) The position of the double bond is not given.				
1,7-Diphenylheptene (a)				
	201–203 10 [8]			
(a) The position of the double bond is not given.				
3-Phenyl-4-*p*-tolylhexene-3 				
	170 11 [35,36]			

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,6-Diphenyl-3-methylenehexane 	199–200 14 [53]	0.915 18° [53]	1.5517 18° [53]	
1,2-Diphenyl-3-ethylpentene-2 	180–182 15 [1]			
1-Phenyl-1-*p*-tolyl-2-ethylbutene (a)	172 11 [35,36]			
(a) The position of the double bond is given as 1 in reference 36 and as 2 in reference 35				
$C_{20}H_{24}$				
1,1-Diphenyloctene-1 				
−6–−5.5 [44]	133–134 0.05 [44]	0.9937 [44]	1.5608 [44]	

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Diphenyl-3-methyl-3-ethylpentene-1 	175–180 12 [34]	0.9791 25° [34]	1.56671 25° [34] 1.56110 $n_{H\alpha}^{25}$ [34] 1.58131 $n_{H\beta}^{25}$ [34] 1.59467 $n_{H\gamma}^{25}$ [34]	
1,2-Di-(4′-isopropylphenyl)-ethene 				
131–132 [25] 129 [31]				
1,2-Di-(2′,4′,5′-trimethylphenyl)-ethene 				
161 [5,10] 159–161 [32]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Di-(2′,4′,6′-trimethylphenyl)-ethene 				
132.5–133.5 [14]				
$C_{21}H_{26}$				
1,9-Diphenylnonene-4 				
	231–233 12 [8]			
1-Phenyl-2-(2′,4′,6′-triisopropylphenyl)-ethene 				
33–34 [14]	155–161 4 [14]			
$C_{24}H_{32}$				
1,1-Diphenyldodecene-1 				
5–6 [44]	170–171 0.05 [44]	0.9334 [44]	1.5429 [44]	

M. P., °C	B. P., °C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1,1-Diphenyltetradecene-1 							
			0.9268		**1.5363**		
16.3 [9,42]	205	1.0 [9]	0.9267 [9,42]		1.5363 [9,42]		
	192	0.5 [9]	0.8725	98.9° [9]	1.5280	40.0° [9]	
			0.8986	60° [9]	1.5322	30.0° [9]	
			0.9143	37.8° [9]			
* $\frac{dD}{dt} = -0.0007152[1-0.0004820(t-20)]$/°C (37 to 99°C)							
† $\frac{dn}{dt} = -0.000415$/°C (20 to 40°C)							
$C_{28}H_{40}$ **1,1-Diphenylhexadecene-1** 							
			0.9188				
25.5 [44]	265–270	13 [46]	0.9186 [21]		1.5312 [44]		
21.5–22.5 [21]	274–275	12 [21]	0.9191 [44]		1.52964	21.5° [21]	
17–18 [46]	196–197	0.04 [44]	0.8666	100° [13]	1.52008	$n_{H\alpha}^{21.5}$ [21]	
			0.8991	50° [13]	1.54146	$n_{H\beta}^{21.5}$ [21]	
			0.9316	0° [13]	1.55160	$n_{H\gamma}^{21.5}$ [21]	
* $\frac{dD}{dt} = -0.0006520$/°C (0 to 100°C)							
$C_{30}H_{44}$ **1,1-Diphenyloctadecene-1** 							
−1 [46]	282–283	18 [46]	0.9186 [44]		1.5308 [44]		
	202–203	0.04 [44]	0.9170	25° [28]	1.5269	25° [28]	

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-2-benzylheptadecene-2 				*
		0.9237		
58.5 [21]	290-292 16 [21]	0.9237 [21]	1.52303 23.5° [21]	
		0.8717 100° [13]	1.51882 $n_{H\alpha}^{23.5}$ [21]	
		0.9042 50° [13]	1.53302 $n_{H\beta}^{23.5}$ [21]	
		0.9367 0° [13]	1.54220 $n_{H\gamma}^{23.5}$ [21]	
$*\frac{dD}{dt} = -0.0006500$/°C	(6 to 100°C)			
$C_{42}H_{68}$				
1,1-Di-(methylphenyl)-octacosene-1 (a)				
47 [38]				
(a) The position of the methyl substituents is not given.				

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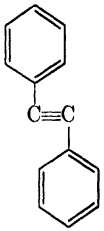
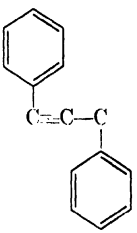
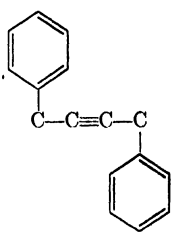
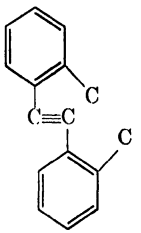
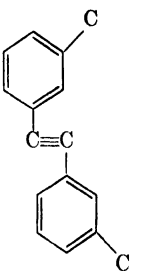
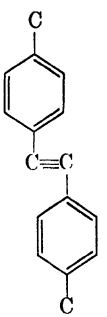
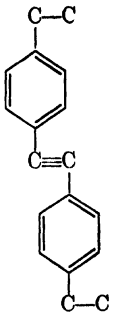
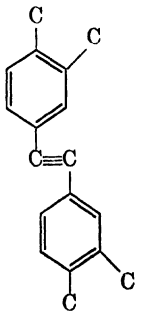
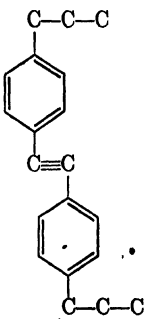
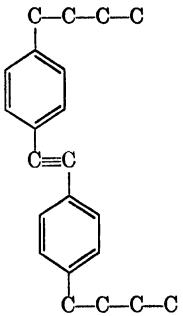
M. P.,°C	B. P.,°C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
Diphenylethyne (Diphenylacetylene) (Tolane) 							
60.9							
62–63.5 [45]	170	19 [35]	0.9657	99.8° [42]	1.60600	$n_{H\alpha}^{99.8}$ [42]	
62.5 [32,41]	158	12 [3]			1.64302	$n_{H\beta}^{99.8}$ [42]	
62 [2,30,44]	158–160	10.5 [25]			1.6163	$n_{H\gamma}^{99.8}$ [42]	
60.5–61.5 [43]	133	8 [5]					
61 [18,34]	111–112	1 [23]					
60–61 [10,11,27,34,36]							
59–61 [38]							
59.5–60.5 [39]							
60(a)							
59 [5]							
58–59 [35]							

(a) The melting point 60 is found in references 1, 3, 4, 9, 12, 17, 18, 19, 24, 25, 26, 27, 28, 29, 31, 33, 40.

$C_{15}H_{12}$							
1,3-Diphenylpropyne 							
	128–129	1–2 [21]	1.0273 [21]		1.5946 [21]		
					1.5881	$n_{H\alpha}^{20}$ [21]	
					1.6113	$n_{H\beta}^{20}$ [21]	
$C_{16}H_{14}$							
1,4-Diphenylbutyne-2 							
80 [14,15,16]							

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Di-*o*-tolylethyne			1.6228 [6]	
Di-*m*-tolylethyne 73.5–74 [6]				
Di-*p*-tolylethyne 136 [4,8,13,20] 135 [17]				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Di-(4-ethylphenyl)-ethyne  71.5–72.5 [7] 72 [23]				
Di-(3,4-dimethylphenyl)-ethyne  143–144 [7]				
$C_{20}H_{22}$ Di-(4-*n*-propylphenyl)-ethyne  69.5–70.5 [7]				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Di-(4-*n*-butylphenyl)-ethyne 				
41–42[7]				

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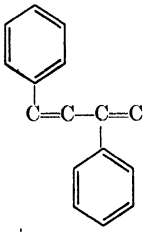
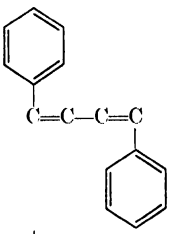
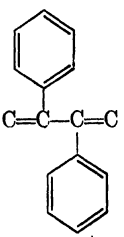
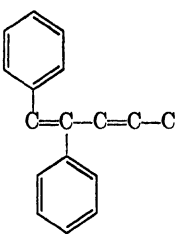
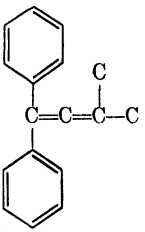
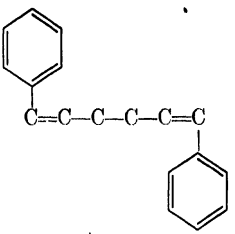
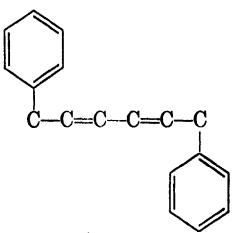
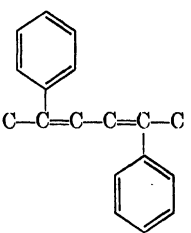
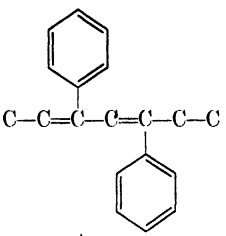
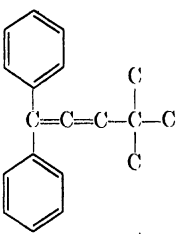
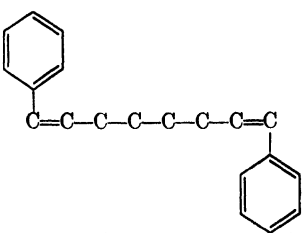
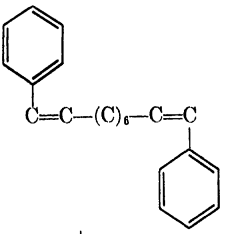
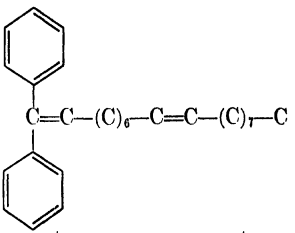
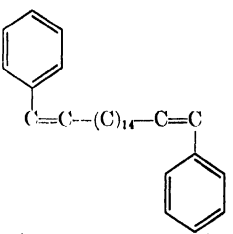
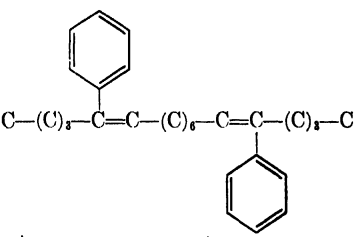
4. TWO PHENYL SUBSTITUTIONS ON ALKADIENES, C_nH_{2n-18}

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3-Diphenylbutadiene-1,3 (a) 				
138 [43]				
137 [8]				
(a) This compound is given as 2,5-diphenylbutadiene but is probably the 1,3-compound.				
***cis,cis*-1,4-Diphenylbutadiene-1,3** 				
70–70.5 [40]		0.9697 100.6° [45]	1.61831 $n_{H\alpha}^{100.6}$ [45]	
70 [11,12,22,24]		0.9707 99.5° [45]	1.66748 $n_{H\beta}^{100.6}$ [45]	
			1.63473 $n_{He}^{100.6}$ [45]	
***cis,trans*-1,4-Diphenylbutadiene-1,3**				
			1.59679 $n_{H\alpha}^{22.2}$ [45]	
150–151 [40]	133–135 0.1 [24]	0.999 [45]	1.61716 $n_{H\alpha}^{19.7}$ [45]	
88 [13]		1.007 [45]	1.62830 $n_{H\beta}^{22.2}$ [45]	
		0.9974 22.2° [45]	1.65481 $n_{H\beta}^{19.7}$ [45]	
		1.0072 19.7° [45]	1.65212 $n_{H\gamma}^{22.2}$ [45]	
			1.68419 $n_{H\gamma}^{19.7}$ [45]	
			1.60532 $n_{He}^{22.2}$ [45]	
			1.6063 n_{He}^{20} [45]	
			1.6272 n_{He}^{20} [45]	
			1.62737 $n_{He}^{19.7}$ [45]	
***trans,trans*-1,4-Diphenylbutadiene-1,3**				
149.7				
152.5–153.5 [9]	350 720 [18]			
152–153.5 [16]				
152–153 [39]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
***trans, trans*-1,4-Diphenylbutadiene-1,3** (*Continued*)				
152.5 [18]				
152–152.5 [41]				
152 [38]				
151 [17]				
150–151 [40]				
150 [11,12,13,17,47]				
149 [43]				
148–149 [3]				
148.4 [25]				
148 [7,13,21,27,48,49]				
147–148 [28,31]				
147 [32,33]				
2,3-Diphenylbutadiene-1,3 				
49				
50 [23]		0.9842 65.9° [44]	1.57939 $n_{H\alpha}^{65.9}$ [44]	
49 [15]		0.9829 65.8° [44]	1.57920 $n_{H\alpha}^{65.8}$ [44]	
47–49 [44]			1.60496 $n_{H\beta}^{65.9}$ [44]	
47–48 [1]			1.60469 $n_{H\beta}^{65.8}$ [44]	
46–48 [44]			1.62213 $n_{H\gamma}^{65.9}$ [44]	
46–47 [1]			1.62186 $n_{H\gamma}^{65.8}$ [44]	
			1.58669 $n_{He}^{65.9}$ [44]	
			1.58633 $n_{He}^{65.8}$ [44]	
$C_{17}H_{16}$ **1,2-Diphenylpentadiene-1,3** 				
48–49 [6]	158–160 5–6 [6]			

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Diphenyl-3-methylbutadiene-1,2 	147–148 20 [2]			
$C_{18}H_{18}$ **1,6-Diphenylhexadiene-1,5** 				
82 [30]	211 11 [30]	0.9919 D_{20}^{20} [10]	1.5890 [10]	
81–82 [5,46]	180 5 [46]			
81 [27,34]	157–160 2 [10]			
1,6-Diphenylhexadiene-2,4 				
79 [18A]				
78 [19]				
2,5-Diphenylhexadiene-2,4 				
138 [42]				
134–136 [14]				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Isodicinnamyl (a)				
	187–189 13 [26]	0.9986 18° [26]	1.58724 18° [26]	
(a) The structure is not given, but the compound is probably a diphenylhexadiene.				
$C_{19}H_{20}$				
3,5-Diphenylheptadiene-2,4 				
	191–195 20 [29]			
1,1-Diphenyl-4,4-dimethylpentadiene-1,2 				
	115–118 0.55 [36]	0.9661 [36]	1.569 [36]	
$C_{20}H_{22}$				
1,8-Diphenyloctadiene-1,7 				
61–62 [5]				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,10-Diphenyldecadiene-1,9 				
53 [4,34]				
$C_{30}H_{42}$				
1,1-Diphenyloctadecadiene-1,9 				
	285–290 20 [35] 285–286 15 [35]			
1,18-Diphenyloctadecadiene-1,17 				
93 [34]				
5,14-Diphenyloctadecadiene-5,13 				
		0.9306 25° [20]	1.5398 25° [20]	

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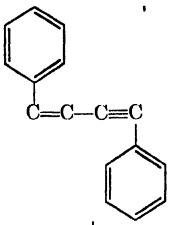
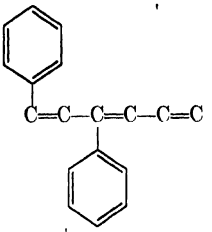
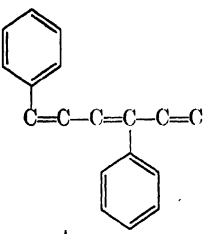
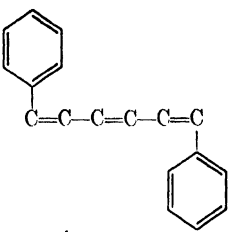
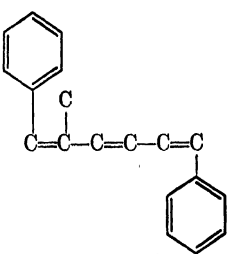
5. TWO PHENYL SUBSTITUTIONS ON ALKENYNES, C_nH_{2n-20}

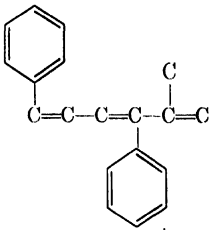
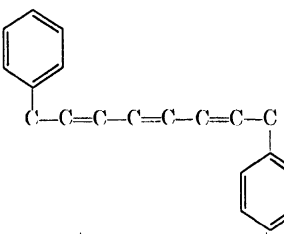
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Diphenylbuten-1-yne-3 				
96.5–97 [3]	188(b) 12 [1,2]			
95.5–96.25(a) [3]	187.5			
95–96(a) [1,2]	–188(c) 12 [3]			

(a) This constant was determined on the *trans* isomer.
(b) This constant was determined on a mixture of *cis* and *trans* isomers.
(c) This constant was determined on the *cis* isomer.

References on Two Phenyl Substitutions on Alkenynes

1. Grignard, V., and Tchéoufaki, Compt. rend. **188**, 1531 1929.
2. Grignard, V., and Tchéoufaki, Rec. trav. chim. **48**, 899 1929.
3. Straus, F., Ann. **342**, 190 1905.

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3-Diphenylhexatriene-1,3,5 				
194 [12,18]				
1,4-Diphenylhexatriene-1,3,5 				
196 [3]				
1,6-Diphenylhexatriene-1,3,5 				
202 [9] 201 [5] 200 [6]		1.139 [4]		
$C_{19}H_{18}$				
1,6-Diphenyl-2-methylhexatriene-1,3,5 				
115–116 [1]				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Diphenyl-5-methylhexatriene-1,3,5 				
97–98 [11]				
$C_{20}H_{20}$				
1,8-Diphenyloctatriene-2,4,6 				
68 [7]				
Diphenyldibutadiene (a)				
	221 17 [8]	1.0325 [8]	1.6016 [8]	
	217–220 17 [2]			
	205 10(b) [10]			
	194 3(c) [10]			

(a) Structures were not given. The constants were probably determined on more than one compound.
(b) The author stated that this constant was determined on the dimer of *cis*-phenylbutadiene.
(c) The author stated that this constant was determined on the dimer of *trans*-phenylbutadiene.

References on Two Phenyl Substitutions on Alkatrienes

1. Bauer, H., Ber. **38**, 688 1905.
2. Döbner, O., and H. Staudinger, Ber. **36**, 4318 1903.
3. Farmer, E. H., B. D. Laroia, T. Switz, and J. Thorpe, J. Chem. Soc. **1927**, 2937.
4. Hengstenberg, J., and R. Kuhn, Z. Krist. **75**, 301 1930.
5. Kuhn, R., and K. Hallenfels, Ber. **71**, 1889 1938.
6. Kuhn, R., and A. Winterstein, Helv. Chim. Acta **11**, 87 1928.
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8. Liebermann, C., and C. Rüber, Ber. **35**, 2696 1902.
9. Müller, E., and I. Dammerau, Ber. **70**, 2561 1937.
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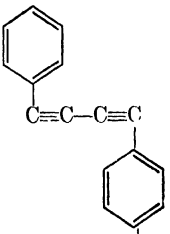
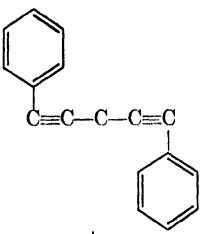
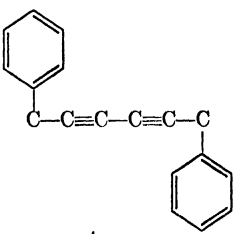
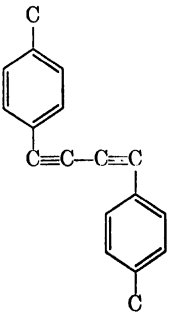
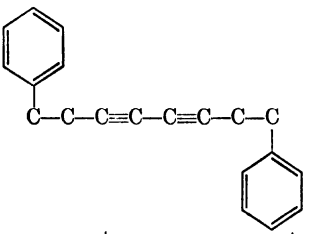
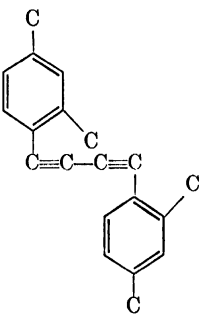
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Diphenylbutadiyne (Diphenyldiacetylene) 				
88				
87–88.5 [14]		0.88674 [9]	1.50513 [9]	
88.0 [11]		0.9056 13° [9]	1.5300 13° [9]	
88 [2,6,8]			1.50275 $n_{H\alpha}^{20}$ [9]	
87–88 [10,17]			1.5240 $n_{H\alpha}^{13}$ [9]	
87 [1,8]				
86.5–87 [5]				
86–87 [12,15,16]				
85–87 [13]				
$C_{17}H_{12}$				
1,5-Diphenylpentadiyne-1,4 				
88–90 [3]				
$C_{18}H_{14}$				
1,6-Diphenylhexadiyne-2,4 				
101 [5]				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Di-*p*-tolylbutadiyne  183[7]				
$C_{20}H_{18}$				
1,8-Diphenyloctadiyne-3,5  118[5]				
1,4-Di-(2′·4′-dimethylphenyl)-butadiyne  145.5–146[5] 138[4]				

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1. Danehy, J. P., and J. A. Nieuwland, J. Am. Chem. Soc. **58**, 1609 1936.
2. Gilman, H., and R. McCracken, J. Am. Chem. Soc. **51**, 821 1929.
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7. Kunckell, F., Ber. deut. pharm. Ges. **23**, 188 1913.
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10. Ott, E., and R. Schröter, Ber. **60**, 624 1927.
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14. Yoriek, J. Russ. Phys. Chem. Soc. **35**, 555 1903; Gilman and McCracken, J. Am. Chem. Soc. **51**, 821 1928.
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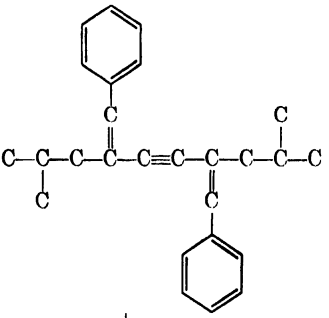
16. Zalkind, Y. S., and F. B. Fundyler, Ber. **69**, 128 1936.
17. Zalkind, Y., and A. Kruglov, Ber. **59**, 1936 1926.

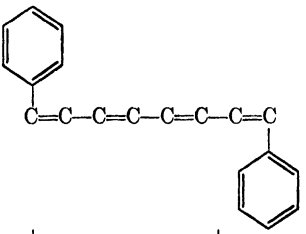
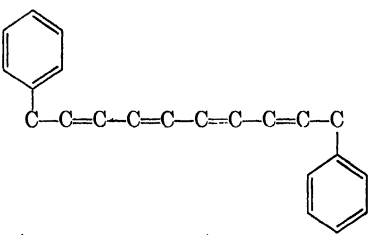
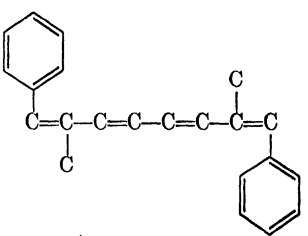
8. TWO PHENYL SUBSTITUTIONS ON ALKADIENYNES, C_nH_{2n-22}

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,9-Dimethyl-4,7-dibenzylidenedecyne-5 				
	179–180 2[1]	0.9951[1]	1.5872[1]	

References on Two Phenyl Substitutions on Alkadienynes

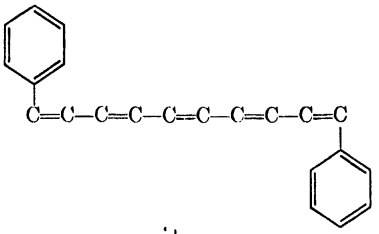
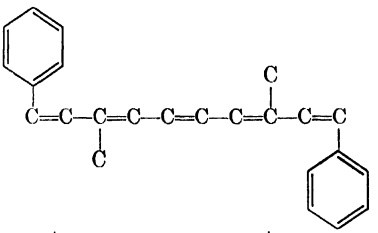
1. Pinkney, P. S., and C. S. Marvel, J. Am. Chem. Soc. 59, 2669 1937.

9. TWO PHENYL SUBSTITUTIONS ON ALKATETRAENES, C_nH_{2n-22}

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,8-Diphenyloctatetraene-1,3,5,7 				
235–237[7] 233[3] 232[4,6]		1.144[2]		
$C_{22}H_{22}$				
1,10-Diphenyldecatetraene-2,4,6,8 				
109–110[5]				
1,8-Diphenyl-2,7-dimethyloctatetraene-1,3,5,7 				
176.5[3] 174[1]				

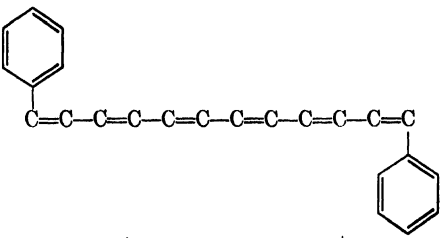
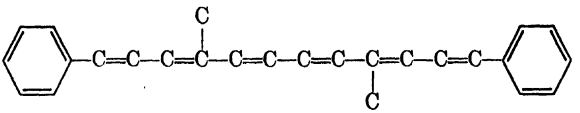
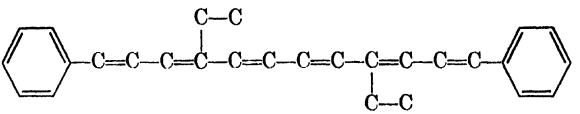
References on Two Phenyl Substitutions on Alkatetraenes

1. Bernhauer, K., and I. Skudezyk, J. prakt. Chem. [2] 155, 310 1940.
2. Hengstenberg, J., and R. Kuhn, Z. Krist. 75, 301 1930.
3. Kuhn, R., and K. Wallenfels, Ber. 71, 1889 1938.
4. Kuhn, R., and A. Winterstein, Helv. Chim. Acta 11, 87 1928.
5. Kuhn, R., and A. Winterstein, Helv. Chim. Acta 11, 123 1928.
6. Müller, E., and I. Dammerau, Ber. 70, 2561 1937.
7. Zechmeister, L., and A. L. LeRosen, J. Am. Chem. Soc. 64, 2755 1942.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,10-Diphenyldecapentaene-1,3,5,7,9 				
253 [3,4]		1.152(a)[1]		
(a) The temperature for this density is not given.				
$C_{24}H_{24}$				
1,10-Diphenyl-3,8-dimethyldecapentaene-1,3,5,7,9 				
196–197 [2]				

References on Two Phenyl Substitutions on Alkapentaenes

1. Hengstenberg, J., and R. Kuhn, Z. Krist. **75**, 301 1930.
2. Kuhn, R., and K. Wallenfels, Ber. **71**, 1889 1938.
3. Kuhn, R., and A. Winterstein, Helv. Chim. Acta **11**, 87 1928.
4. Müller, E., and I. Dammerau, Ber. **70**, 2561 1937.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,12-Diphenyldodecahexaene-1,3,5,7,9,11 				
268 [4] 267 [3,5]		1.135(a) [3]		
(a) The temperature for this density is not given.				
$C_{26}H_{26}$				
1,12-Diphenyl-4,9-dimethyl-dodecahexaene-1,3,5,7,9,11 				
217(a) [1]				
(a) Decomposition takes place at the melting point.				
$C_{28}H_{30}$				
1,12-Diphenyl-4,9-diethyl-dodecahexaene-1,3,5,7,9,11 				
206.5–209.5 [1]				

References on Two Phenyl Substitutions on Alkahexaenes

1. Bernhauer, K., and I. Skudrzyk, J. prakt. Chem. [2] 155, 310 1940.
2. Hengstenberg, J., and R. Kuhn, Z. Krist. 75, 301 1930.
3. Kuhn, R., Angew. Chem. 50, 703 1937.
4. Kuhn, R., and K. Wallenfels, Ber. 70, 1331 1937.
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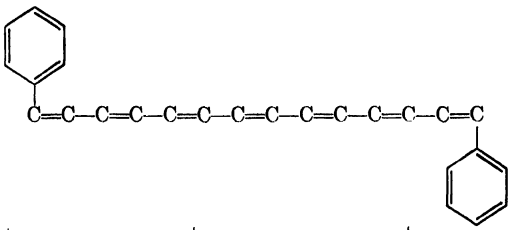
12. TWO PHENYL SUBSTITUTIONS ON ALKAHEPTAENES, C_nH_{2n-28}

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,14-Diphenyltetradecaheptaene-1,3,5,7,9,11,13 				
279 [2]		1.130(a) [1]		

(a) The temperature for this density is not given.

References on Two Phenyl Substitutions on Alkaheptaenes.

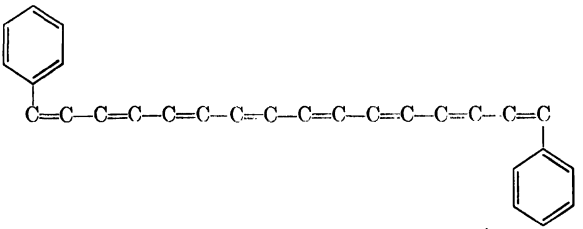
1. Hengstenberg, J., and R. Kuhn, Z. Krist. 75, 301 1930.
2. Kuhn, R., and A. Winterstein, Helv. Chim. Acta 11, 87 1928.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2,11,11-Tetramethyl-6,7-di-(4′,4′-dimethylpentyn-1′-yl)-6,7-diphenyldodecadiyne-4,8				
98–99[1]				

References on Two Phenyl Substitutions on Alkatetraynes

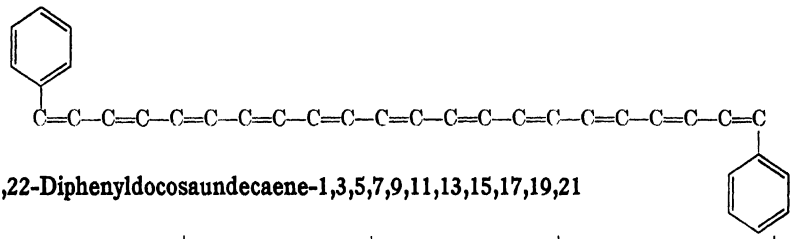
1. Rossander, S. S., and C. S. Marvel, J. Am. Chem. Soc. **51**, 932 1929.

14. TWO PHENYL SUBSTITUTIONS ON ALKAOCTAENES, C_nH_{2n-30}

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,16-Diphenylhexadeca-octaene-1,3,5,7,9,11,13,15 				
285 [1]				

References on Two Phenyl Substitutions on Alkaoctaenes

1. Kuhn, R., and A. Winterstein, Helv. Chim. Acta **11**, 87 1928.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
 **1,22-Diphenyldocosaundecaene-1,3,5,7,9,11,13,15,17,19,21**				
318[1]				

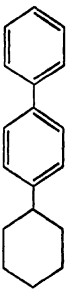
References on Two Phenyl Substitutions on Alkaundecaenes

1. Kuhn, R., Angew. Chem. 50, 703 1937.

VI. BIPHENYL WITH ALICYCLIC SUBSTITUTIONS

1. Biphenyl with One Cyclyl Substitution C_nH_{2n-16}
2. Biphenyl with One Cyclenyl Substitution C_nH_{2n-18}
3. Biphenyl with Two Cyclyl Substitutions C_nH_{2n-18}

1. BIPHENYL WITH ONE CYCLYL SUBSTITUTION, C_nH_{2n-16}

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4-Cyclohexylbiphenyl 				
75				
75–76[2]	213–222 15[4]			
75[3]	207–210 12[3]			
73–75[5]				
74 5[1]				

References on Biphenyl with One Cyclyl Substitution

1. Basford, F. R., J. Chem. Soc. **1936**, 1593.
2. Bodroux, D., Ann. chim. [10] **11**, 511 1929.
3. Buu-Hoï and P. Cagniant, Compt. rend. **216**, 381 1943; C.A. **38**, 2334 1938.
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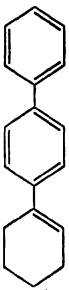
2. BIPHENYL WITH ONE CYCLENYL SUBSTITUTION, C_nH_{2n-18}

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4-(Cyclohexen-1′-yl)-biphenyl 				
146–148[1]	190 1[1]			

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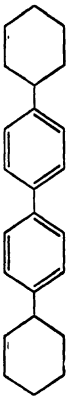
3. BIPHENYL WITH TWO CYCLYL SUBSTITUTIONS, C_nH_{2n-18}

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4,4′-Dicyclohexylbiphenyl 				
205				
205–206 [2]				
205 [1,6,7]				
202–203 [3,4]				
202 [5]				

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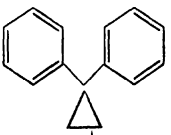
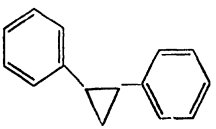
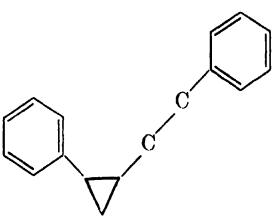
VII. TWO PHENYL SUBSTITUTIONS ON ALICYCLICS OR ALICYCLICALIPHATICS AND ALICYCLICDIPHENYL SUBSTITUTIONS ON ALIPHATICS

1. Two Phenyl Substitutions on Cyclanes or Two Phenyl and One Cyclyl Substitutions on Alkanes C_nH_{2n-16}
2. Two Phenyl Substitutions on Cyclenes, Two Phenyl and One Cyclylidene Substitutions on Alkanes, or Two Phenyl and One Cyclyl Substitutions on Alkenes C_nH_{2n-18}
3. Two Phenyl Substitutions on Bicyclanes C_nH_{2n-18}
4. Two Phenylalkyl Substitutions on Dicyclanes C_nH_{2n-18}
5. Two Cyclylphenyl or Two Cyclyl and Two Phenyl Substitutions on Alkanes C_nH_{2n-18}
6. Two Phenyl Substitutions on Cyclodienes C_nH_{2n-20}
7. Two Phenyl Substitutions on Alkenylcyclenes or Alkylidenecyclenes C_nH_{2n-20}
8. Two Phenyl Substitutions on Bicyclenes C_nH_{2n-20}
9. Two Phenyl Substitutions on Tricyclanes C_nH_{2n-20}
10. Two Phenyl Substitutions on Bicyclodienes C_nH_{2n-22}
11. Two Phenyl Substitutions on Tricyclylalkenes or Tricyclenes C_nH_{2n-22}
12. Two Phenyl and One Cyclodienylidene Substitutions on Alkanes C_nH_{2n-22}
13. Two Dicyclylphenyl Substitutions on Alkanes C_nH_{2n-22}

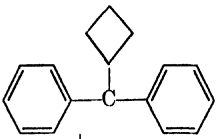
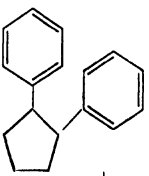
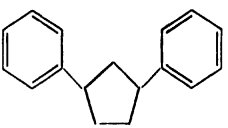
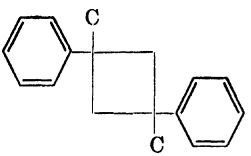
1. TWO PHENYL SUBSTITUTIONS ON CYCLANES OR TWO PHENYL AND ONE CYCLYL SUBSTITUTIONS ON ALKANES, C_nH_{2n-16}

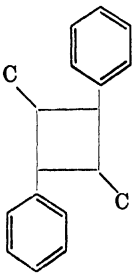
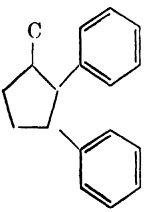
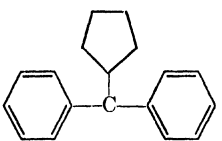
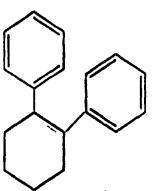
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Diphenylcyclopropane 				
	140 12 [35]			
1,2-Diphenylcyclopropane 				
	307.5 741 [18]	1.0317 [18]	1.5967 [18]	
	164–166 13 [22]	1.0316 21° [22]	1.5897 21° [22]	
	149 9.5 [18]			
$C_{16}H_{16}$				
1,3-Diphenylcyclobutane (a)				
	157–158 8 [28]			

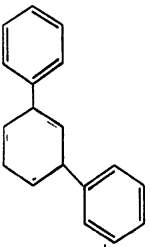
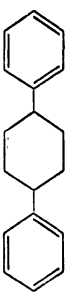
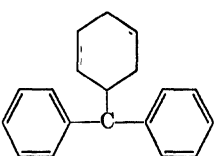
(a) This is the probable structure of the compound. The author has named it 1,3-Diphenyltetramethylene.

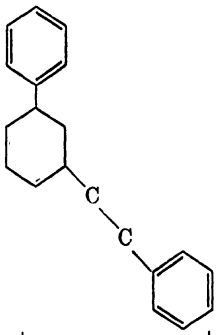
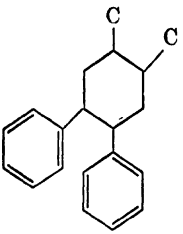
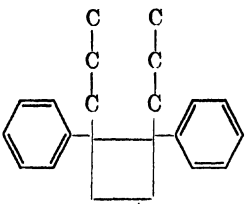
$C_{17}H_{18}$						
1-Phenyl-2-phenethylcyclopropane (a) 						
65.5 [19]	321.5	735 [19]	0.9995	15° [19]	1.5666	15° [19]
	204.5	28 [19]	1.0063	15° [19]	1.5718	15° [19]
	176	8 [19]	1.0165	0° [19]		

(a) These values represent two preparations of the compound.

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclobutyldiphenylmethane 				
39.5 [17]		1.0003 $D_0^{43.5}$ [17]	1.5636 43.5° [17]	
1,2-Diphenylcyclopentane 				
65(a) [34] 63(a) [2] 47(b)(c)	189 12 [13]			
(a) This constant was determined on the *cis* isomer. (b) This constant was determined on the *trans* isomer. (c) The melting point 47 is found in references 2, 10, 11, 13, 31, 32, 34.				
1,3-Diphenylcyclopentane 				
	140–141 3 [6]	1.0196 25° [6]	1.5696 25° [6]	
$C_{18}H_{20}$				
1,3-Dimethyl-1,3-diphenylcyclobutane 				
52 [27] 51–52 [30]	299–300 [30] 163–164 14–15 [30] 118–120 0.1 [27]	1.0038 [27] 1.1183 (solid) [27]	1.5633 [27]	

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3-Dimethyl-2,4-diphenylcyclobutane 				
52.6 [7]	307.5 [7]	0.9904 D_{25}^{25} [7]	1.5660 25° [7]	
1-Methyl-2,3-diphenylcyclopentane 				
62–63 [13,14]				
Cyclopentyldiphenylmethane 				
32.5–33 [15,16] 32–33 [38]	126 15 [38]			
1,2-Diphenylcyclohexane 				
172 173 [9] 172 [38] 170–171 [20] 169–170 [1]				

M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3-Diphenylcyclohexane 				
	196–198 17 [24]	1.0022(a) [24]		
(a) The temperature for this density is not given.				
1,4-Diphenylcyclohexane 				
170 [24]	190 29 [29]			
$C_{19}H_{22}$				
Diphenylcyclohexylmethane 				
58				
58.5 [4,5]	252–257 [1]	1.005 [1]	1.571 [1]	
56–57 [27]	156–158 0.25 [23]	1.029 8° [1]	1.575 [22]	
56.5 [26]		1.106 0° [36]	1.587 8° [1]	
56 [25]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-3-phenethylcyclohexane 				
	205-206 11 [21]		1.55787 [21] 1.55324 $n_{H\alpha}^{20}$ [21] 1.56936 $n_{H\beta}^{20}$ [21] 1.57944 $n_{H\gamma}^{20}$ [21]	
1,2-Dimethyl-4,5-diphenylcyclohexane 				
97 [8]	270 [8]			
Cyclohexylphenethylbenzene (a)				
68-69 [1]				
(a) The position of the cyclohexyl substitution is not given.				
$C_{22}H_{28}$				
1,2-Di-*n*-propyl-1,2-diphenylcyclobutane 				
	208-212 [8]	0.9601 23° [8]		

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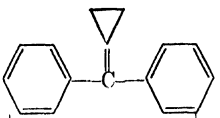
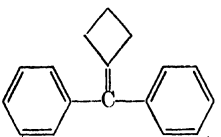
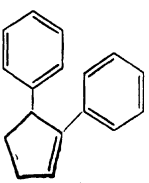
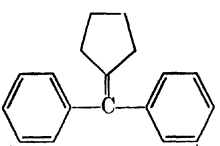
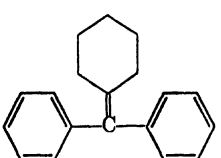
2. TWO PHENYL SUBSTITUTIONS ON CYCLENES, TWO PHENYL AND ONE CYCLYLIDENE SUBSTITUTIONS ON ALKANES, OR TWO PHENYL AND ONE CYCLYL SUBSTITUTIONS ON ALKENES, C_nH_{2n-18}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclopropylidenediphenylmethane 	110–114 0.5[7]			
$C_{17}H_{16}$				
Cyclobutylidenediphenylmethane 				
58[4]				
1,2-Diphenylcyclopentene-2 				
15–16[5]	321.5 747[5] 184 19[5] 177 13[5]	1.0355[5] 1.036[5]	1.5873[5] 1.5881[5]	
$C_{18}H_{18}$				
Cyclopentylidenediphenylmethane 				
62–63[10] 62–62.5[3]	183–185 9[3] 180–181 6–7[3]			
$C_{19}H_{20}$				
Cyclohexylidenediphenylmethane 				
84–85[1] 84[2] 83[3]				

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-3-phenethenylcyclohexane	191–192 3.5[6]			
1,1-Diphenyl-2-cyclohexylethene	210–215 15[9]			
Diphenyl-4-methylcyclohexylidenemethane				
65[9]	200 12[9]			

References on Two Phenyl Substitutions on Cyclenes, Two Phenyl and One Cyclylidene Substitutions on Alkanes, or Two Phenyl and One Cyclyl Substitutions on Alkenes

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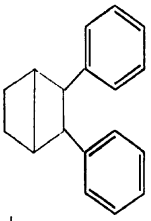
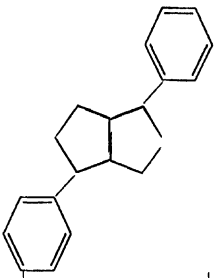
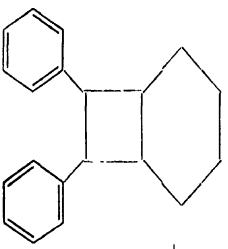
3. TWO PHENYL SUBSTITUTIONS ON BICYCLANES, C_nH_{2n-18}

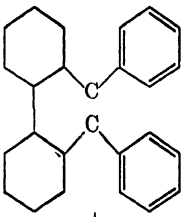
M. P.,°C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,3-Diphenylbicyclo-[2,2,0]-hexane 				
56[1]	212-215 12[1]			
$C_{20}H_{22}$				
2,6-Diphenylbicyclo-[3,3,0]-octane 				
110-112[3]				
7,8-Diphenylbicyclo-[4,2,0]-octane (a) 				
89-90[2]				

(a) The author states that the compound is either this or the preceding one. Because the data does not agree, it is assumed to have this structure.

References on Two Phenyl Substitutions on Bicyclanes

1. Döbner, O., and G. Schmidt, Ber. 40, 148 1907.
2. Fichter, F., and K. Kestenhalz, Helv. Chim. Acta 25, 785 1942.
3. Wawzonek, L., J. Am. Chem. Soc. 65, 839 1943.

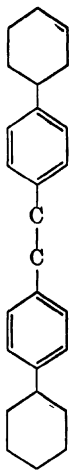
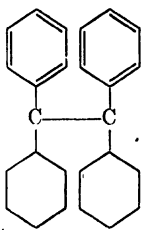
4. TWO PHENYLALKYL SUBSTITUTIONS ON DICYCLANES, C_nH_{2n-18}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2′-Dibenzyldicyclohexane 				
180–181 [1]				

References on Two Phenylalkyl Substitutions on Dicyclanes

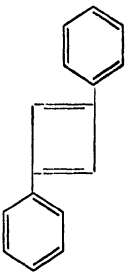
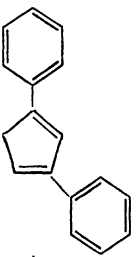
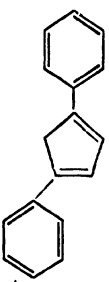
1. Cook, J. W., C. L. Hewett, and C. A. Lawrence, J. Chem. Soc. 1936, 71.

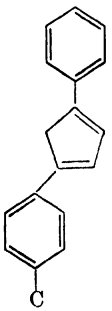
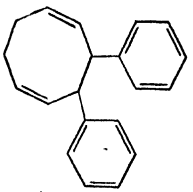
5. TWO CYCLYLPHENYL OR TWO CYCLYL AND TWO PHENYL SUBSTITUTIONS ON ALKANES, C_nH_{2n-18}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Di-1,2-*p*-cyclohexylphenylethane  148–149 [1,2]				
1,2-Dicyclohexyl-1,2-diphenylethane  198–200 [3]				

References on Two Cyclylphenyl or Two Cyclyl and Two Phenyl Substitutions on Alkanes

1. Bodroux, D., and R. Thomassin, Bull. soc. chim. [5] 6, 1411 1939.
2. Bodroux, D., and R. Thomassin, Compt. rend. 205, 1417 1937.
3. Busch, M., and W. Weber, J. prakt. Chem. [2] 146, 1 1936.

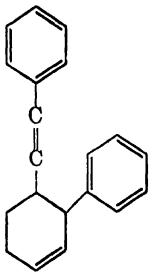
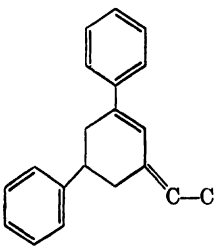
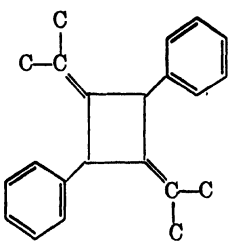
M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,4-Diphenylcyclobutadiene-1,3 				
130[5]				
$C_{17}H_{14}$				
1,3-Diphenylcyclopentadiene-1,3 				
156[1]				
1,4-Diphenylcyclopentadiene-1,3 				
158–158.5[4]				

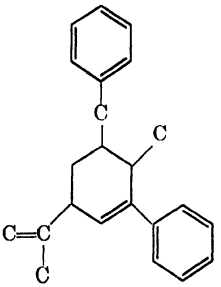
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-4-*p*-tolylcyclopentadiene-1,3 				
153–153.5[4]				
$C_{20}H_{20}$ **Dimethyldiphenylcyclohexadiene** (a)				
	205 10[6]			
(a) The structure of this compound is not given.				
3,4-Diphenylcyclooctadiene-1,5 				
	204–206 10[3] 204–205 10[2]	1.018 15.3°[2]		

References on Two Phenyl Substitutions on Cyclodienes

1. Borsche, W., and W. Menz, Ber. **41**, 190 1908.
2. Döbner, O., Ber. **35**, 2129 1902.
3. Döbner, O., and H. Staudinger, Ber. **36**, 4318 1903.
4. Drake, N. L., and J. R. Adams, J. Am. Chem. Soc. **61**, 1326 1939.
5. Gastaldi, C., and F. Cherchi, Gazz. chim. ital. **44**, I, 283 1914.
6. von der Heide, C., Ber. **37**, 2101 1904.

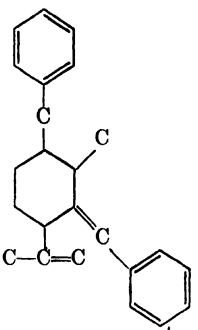
7. TWO PHENYL SUBSTITUTIONS ON ALKENYLCYCLENES OR ALKYLIDENECYCLENES, C_nH_{2n-40}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenethenyl-2-phenylcyclohexene-3 	210–212 12[1]			
1,5-Diphenyl-3-ethylidenecyclohexene-1 	152 22[2]			
$C_{22}H_{24}$ 1,3-Diisopropylidene-2,4-diphenylcyclobutane 	202 11[4]			

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Benzyl-2-methyl-3-phenyl-5-isopropenylcyclohexene-3 				
	234–237 13[3]			$[\alpha]_D^{20}$ = −73.51°[3] (a)

(a) Angles of rotation for lines other than D are given in reference 3.

$C_{24}H_{28}$

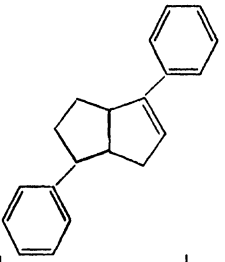
1-Benzyl-2-methyl-3-benzylidene-4-isopropenylcyclohexane 				
	232–235 11[3]	1.0015[3]	1.58159[3]	$[\alpha]_D^{20}$ = +7.42°[3] (a)

(a) Angles of rotation for lines other than D are given in reference 3.

References on Two Phenyl Substitutions on Alkenylcyclenes or Alkylidenecyclenes

1. Bergmann, E., J. Chem. Soc. **1935**, 1359.
2. Kohler, E. P., Am. Chem. J. **37**, 369 1907.
3. Rupe, H., and W. Tomi, Ber. **47**, 3064 1914.
4. Störmer, R., and H. Strok, Ber. **68**, 2102 1935.

8. TWO PHENYL SUBSTITUTIONS ON BICYCLENES, C_nH_{2n-20}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,6-Diphenylbicyclo-[3,3,0]-octene-2 				
115–116[1]				

References on Two Phenyl Substitutions on Bicyclenes

1. Wawzonek, S., J. Am. Chem. Soc. 65, 839 1943.

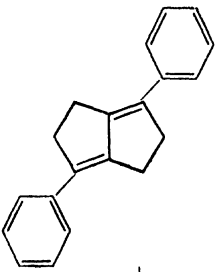
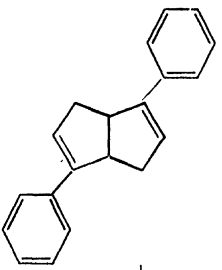
9. TWO PHENYL SUBSTITUTIONS ON TRICYCLANES, C_nH_{2n-20}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3,4-Diphenyltricyclo-[4,2,0,$0^{2,5}$]-octane				
	204–206 12[1]			

References on Two Phenyl Substitutions on Tricyclanes

1. Döbner, O., and G. Schmidt, Ber. **40**, 148 1907.

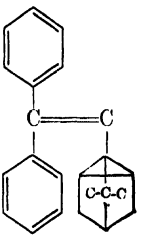
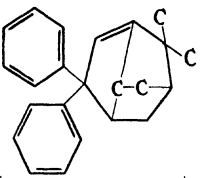
10. TWO PHENYL SUBSTITUTIONS ON BICYCLODIENES, C_nH_{2n-22}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,6-Diphenylbicyclo-[3,3,0]-octadiene-1,5 				
188–190[1]				
2,6-Diphenylbicyclo-[3,3,0]-octadiene-2,6 				
136–138[1]				

References on Two Phenyl Substitutions on Bicyclodienes

1. Wawzonek, S., J. Am. Chem. Soc. **65**, 839 1943.

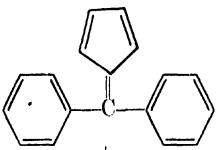
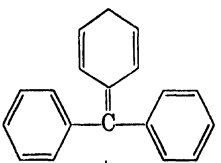
11. TWO PHENYL SUBSTITUTIONS ON TRICYCLYLALKENES OR TRICYCLENES, C_nH_{2n-22}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Diphenyl-2-(7′,7′-dimethyltricyclo-[2,2,1,0$^{2',6'}$]-heptanyl)-ethene 				
71[1] 70–71[2]	154 0.06[1]			
2,2-Dimethyl-6,6-diphenyltricyclo-[3,2,1,1^{3,8}]-nonene-7 				
83–84[2]				

References on Two Phenyl Substitutions on Tricyclylalkenes or Tricyclenes

1. Asahina, Y., and T. Sano, Ber. **73**, 747 1940.
2. Lipp, P., and M. Quadvlieg, Ber. **62**, 2311 1929.

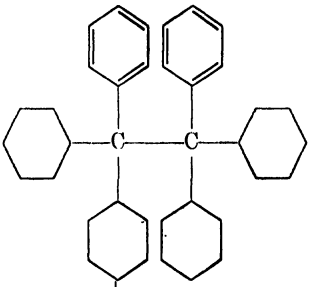
12. TWO PHENYL AND ONE CYCLODIENYLIDENE SUBSTITUTIONS ON ALKANES, C_nH_{2n-22}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclopentadien-2,4-ylidenediphenylmethane (Diphenylfulvene) 				
82 [1,3,4,5]				
$C_{19}H_{16}$				
Cyclohexadien-2,5-ylidenediphenylmethane 				
81 [2,6]				

References on Two Phenyl and One Cyclodienylidene Substitutions on Alkanes

1. Courtot, C., Ann. chim. [9] **4**, 168 1915.
2. Gaverdovskaya-Yushkevich, M. V., Sci. Repts. Moscow State Univ. **1936**, No. 6, 263; C.A. **32**, 2524 1938.
3. Grignard, V., and C. Courtot, Compt. rend. **158**, 1763 1914.
4. Hofmann, K. A., A. Metzler, and K. Höbold, Ber. **43**, 1080 1910.
5. Thiele, J., Ber. **33**, 666 1900.
6. Zelinskiĭ, N. D., and M. V. Gaverdovskaya, Ber. **61**, 1049 1928.

13. TWO DICYCLYLPHENYL SUBSTITUTIONS ON ALKANES, C_nH_{2n-22}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,2,2-Tetracyclohexyl-1,2-diphenylethane 	170–171 1.75[1]		1.6710 23°[1]	
Tetracyclohexyldiphenylethane (a)				
157–158(in N_2)[2]				

(a) The structure of this compound is not given.

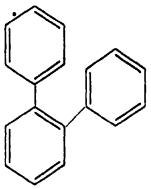
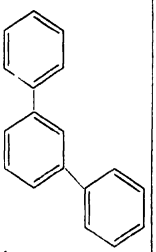
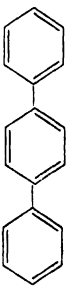
References on Two Dicyclylphenyl Substitutions on Alkanes

1. Gray, A. E., and C. S. Marvel, J. Am. Chem. Soc. 47, 2796 1925.
2. Ziegler, K., and P. Herte, Ann. 551, 222 1942; C.A. 37, 5390 1943.

VIII. TERPHENYLS AND THEIR ALIPHATIC DERIVATIVES

1. Terphenyls and Their Alkyl Derivatives C_nH_{2n-23}

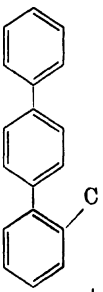
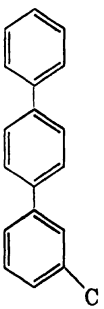
1. TERPHENYLS AND THEIR ALKYL DERIVATIVES, C_nH_{2n-22}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Diphenylbenzene 				
57				
58 [56]	332 [6,21]			
57 [6,21]	20.0 <0.02 [45]			
56–57 [12]				
55 [50]				
1,3-Diphenylbenzene 				
87	**364**			
89 [29,34,69]	365 [6]			
87 [6,19,37,53,56]	364 [4]			
85(a)	363 [60]			
84–85 [20,51]	360 [61]			
	369 766 [20]			
(a) The melting point 85 is found in references 2, 3, 4, 13, 16, 49, 60, 61, 70.				
1,4-Diphenylbenzene (Terphenyl) 				
210	**383**			
214 [4]	385 [4]	1.234 [71]		
213 [6,9,10]	383 [22,60,63]	1.226(b) (solid) [41]		
212–213 [17,18]	376 [6]			
211.5–212.5 [42]	250 45 [60]			

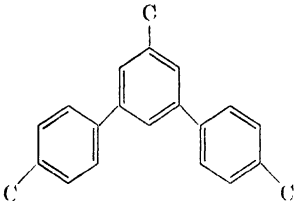
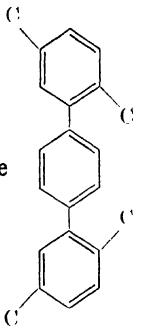
M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Diphenylbenzene *(Continued)*				
212[16,27,34]				
211–212[65]				
211.5[56]				
210–211.5[5]				
211[46,55]				
210–211[47]				
210[51,52,53]				
209–210[35,43,44]				
209.5[32]				
209[57,66,68,69]				
208[24,25,33]				
207[14]				
206[8,15,21,38,39,40]				
205–206[59]				
205(a)				

(a) The melting point 205 is found in references 1, 2, 3, 7, 11, 13, 23, 26, 30, 38, 48, 49, 58, 60, 61, 62, 63, 64, 70.

(b) The temperature for this density is not given.

$C_{19}H_{16}$ **1-Phenyl-4-*o*-tolylbenzene** 				
91–92[5,28]				
1-Phenyl-4-*m*-tolylbenzene 				
169–170[28]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-4-*p*-tolybenzene 207–208 [28] 206–208 [69]				
1-Methyl-3,5-diphenylbenzene 130 [19]				
$C_{20}H_{18}$ 1,4-Di-*p*-tolylbenzene 249–250 [36]				
$C_{21}H_{20}$ 1-Methyl-3,5-di-*m*-tolylbenzene 65 [16]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-3,5-di-*p*-tolylbenzene 				
117[19]				
$C_{22}H_{22}$				
Diethylterphenyl (a)				
280[67]				
(a) The structure of this compound is not given.				
1,4-(Di-2′,5′-dimethylphenyl)-benzene 				
112–113[28]				

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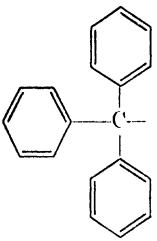
IX. THREE PHENYL OR ONE PHENYL AND ONE BIPHENYLYL SUBSTITUTIONS ON ALIPHATICS

1. Triphenylalkyl Radicals
2. Three Phenyl or One Phenyl and One Biphenylyl Substitutions on Alkanes, or Two Phenylalkyl Substitutions on Benzene C_nH_{2n-22}
3. Three Phenyl or One Phenyl and One Biphenylyl Substitutions on Alkenes C_nH_{2n-24}
4. Three Phenyl Substitutions on Alkynes C_nH_{2n-26}
5. Three Phenyl Substitutions on Alkadienes or Two Phenylalkenyl Substitutions on Benzene C_nH_{2n-26}
6. Three Phenyl Substitutions on Alkenynes C_nH_{2n-28}
7. Three Phenyl Substitutions on Alkatrienes C_nH_{2n-28}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Triphenylmethyl 				
145–147[1,2]				

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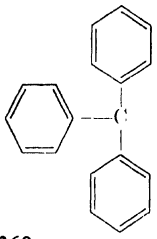
2. THREE PHENYL OR ONE PHENYL AND ONE BIPHENYLYL SUBSTITUTIONS ON ALKANES, OR TWO PHENYLALKYL SUBSTITUTIONS ON BENZENE, C_nH_{2n-22}

M. P., °C		B. P., °C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
Triphenylmethane 								
92.6		**360**		**1.0134**	**100°**			Sublimation Temp., °C
96[81]		360.7[72]		0.954	180°[103]	1.558	180°[103]	200[47]
95[28,43,71]		358–360[5,73,112]		0.969	160°[103]	1.568	160°[103]	
94–95[59,119,120,121,122]		359[68,74]		0.983	140°[103]	1.5775	140°[103]	
94[33,41,12]		358[65,130]		0.996	120°[103]	1.5865	120°[103]	
93.5–94[16]		357	758[80]	1.0081	106.5°[36]	1.595	100°[103]	
93–94[136,137]		307.5	250[72]	1.0155	100.5°[128]	1.50746	18.4°[6]	
93.4[80]		306.0	250[94]	1.009	100°[103]	1.57879	$n_{H\alpha}^{106.5}$[36]	
93.2[87]		266.2	100[72]	1.0195	100°[73]	1.57883	$n_{H\alpha}^{100.5}$[128]	
93–93.2[123]		239	47[51]	1.0570	D_{100}^{100}[94]	1.57776	$n_{H\alpha}^{99.0}$[94]	
93(a)		132	0[68]	1.01405	99.0°[94,128]	1.57779	$n_{H\alpha}^{99.0}$[128]	
92.5–93[92,116]				1.0029	96.78°[20]	1.50266	$n_{H\alpha}^{18.4}$[6]	
92–93(b)				1.0032	95.09°[20]	1.60208	$n_{H\beta}^{106.5}$[36]	
92.8[20]				1.0191	95°[73]	1.60079	$n_{H\beta}^{100.5}$[128]	
92.8[59,88]				1.0568	D_{95}^{95}[94]	1.59965	$n_{H\beta}^{99.0}$[94,128]	
92.6[70]				1.0049	91.98°[20]	1.61364	$n_{H\gamma}^{99.0}$[94,128]	
92.5(c)				1.0078	87.64°[20]	1.58516	$n_{He}^{100.5}$[128]	
92.2–92.5[3]				1.0097	83.95°[20]	(g)		
92–92.5[61]				1.0114	80.86°[20]			
92.3[58]				1.0130	77.75°[20]			
92.2[12]				1.0150	74.41°[20]			
92.1 ± 0.1[31]				1.1106	37.34° (solid)[20]			
92.1[93,118]				1.1169	22.04° (solid)[20]			
92(d)				1.1210	12.85° (solid)[20]			
91–92[19]				1.147	0° (solid)[139]			
91.9[28]				1.148	0° (solid)[139]			
91–91.5[84]				1.135(f)[13]				
91(e)								
	atm.							
176.8	2,904[35]							
170.6	2,629[35]							
170	2,601[35]							
165.8	2,420[35]							
160	2,181[35]							
153.9	1,936[35]							
153.6	1,926[35]							
150	1,795[35]							
140.3	1,452[35]							
140	1,445[35]							

M. P., °C		B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Triphenylmethane (*Continued*)					*
136.2	1,318[35]				
130	1,111[35]				
125.7	968[35]				
120.3	803[35]				†
120	794[35]				
110	489[35]				
109.7	484[35]				
102.0	262[35]				
100	208[35]				

* $t_m = 92.58 + 0.03672p_{atm} - 0.000002662p_{atm}^2$ (1 to 2,904 atm)

† $\frac{dD}{dt} = -0.0007457/°C$ (95 to 180°C)

(a) The melting point 93 is found in references 6, 15, 22, 32, 38, 39, 75, 86, 97, 99, 101, 102, 112, 114, 124, 129, 131.
(b) The melting point 92-93 is found in references 1, 4, 10, 17, 18, 21, 25, 30, 34, 49, 57, 73, 116, 117, 133, 140.
(c) The melting point 92.5 is found in references 5, 26, 60, 63, 95, 100, 108, 111, 113.
(d) The melting point 92 is found in references 2, 5, 7, 8, 9, 11, 14, 24, 27, 29, 37, 40, 44, 45, 46, 47, 48, 50, 52, 53, 54, 55, 56, 62, 64, 66, 67, 76, 77, 79, 82, 83, 85, 89, 90, 91, 96, 98, 104, 105, 106, 110, 125, 127, 130, 132, 135, 138.
(e) The melting point 91 is found in references 23, 69, 78, 107, 109, 126, 134.
(f) The temperature for this density is not given.
(g) Refractive indices at other lines may be found in reference 94.

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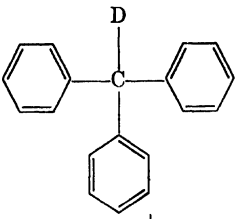
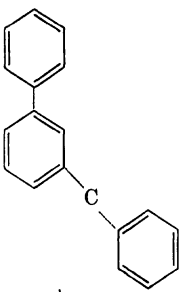
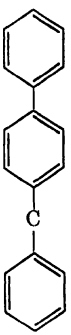
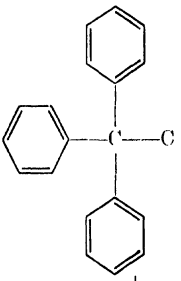
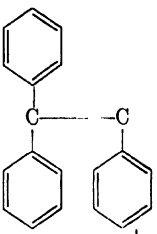
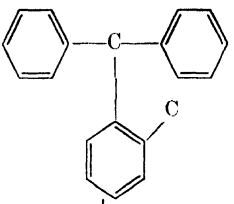
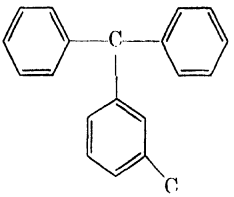
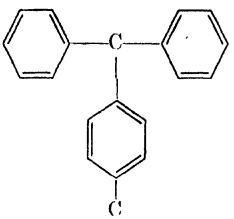
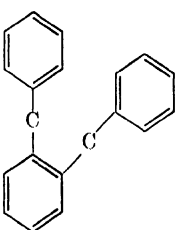
127. Vansheĭdt, A., and B. Moldavskiĭ, Ber. **64**, 917 **1931**.
128. von Auwers, K., and F. Bergmann, Ann. **476**, 272 **1929**.
129. Vorländer, D., and E. Mittag, Ber. **46**, 3450 **1913**.
130. Waser, E., Helv. Chim. Acta **8**, 758 **1925**.
131. Wertheimer, F., Sitzber. Akad. Wiss. Wien, Math. naturw. Klasse **114**, Abt. IIb, 1071 **1905**.
132. Wertyporoch, E., Ber. **66**, 1232 **1933**.
133. Wieland, H., and C. Müller, Ann. **401**, 233 **1913**.
134. Wieland, H., E. Popper, and H. Seefried, Ber. **55**, 1816 **1922**.
135. Wieland, H., and B. Rosenfeld, Ann. **484**, 236 **1930**.
136. Zagoumennyĭ, J. Russ. Phys. Chem. Soc. **12**, 426 **1880**; Ber. **14**, 1402 **1881**.
137. Zagoumennyĭ, through correspondence of A. Krakau, Bull. soc. chim. [2] **34**, 329 **1880**.
138. Zelinskiĭ, N. D., and M. V. Gaverdovskaya, Ber. **61**, 1049 **1928**.
139. Ziegler, K., and F. Ditzel, Ann. **473**, 194 **1929**.
140. Ziegler, K., and F. Thielmann, Ber. **56**, 1740 **1923**.

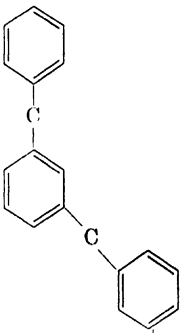
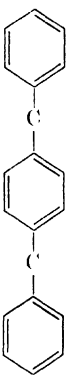
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Triphenylmethane-d 				
92[17] 91–92[17]				
1-Phenyl-3-benzylbenzene (a) 				
54[27]	283–287 650[27]			

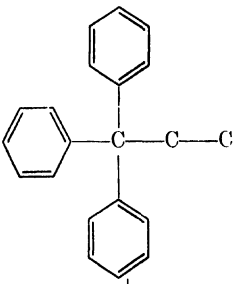
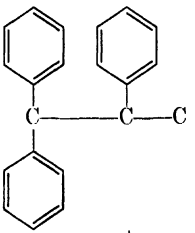
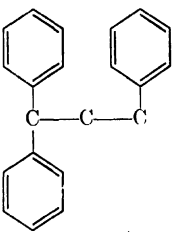
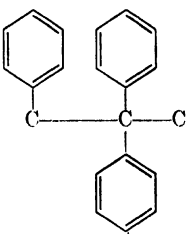
(a) This compound was named isobenzyldiphenyl and is probably 1-phenyl-3-benzylbenzene.

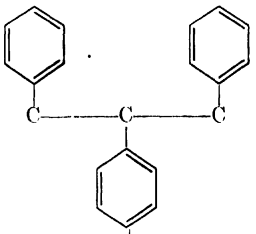
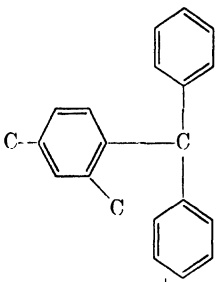
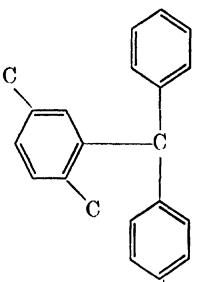
1-Phenyl-4-benzylbenzene 				
85[13,27,40]	285–286 650[27]	1.171 0°[81]		

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,1-Triphenylethane 				
95 [60,74,77] 94–95 [29,63]	220–226 25 [30]			
1,1,2-Triphenylethane 				
55				
56 [58] 54–55 [80] 54.5 [14] 53.5–54.5 [7,78] 54 [21,39,52] 53 [51] 52–53 [2]	356 [61] 348–349 751 [39] 216–217 14 [39] 211 14 [6] 209–211 12 [80] 206–210 12 [2]			
Diphenyl-*o*-tolylmethane 				
82				
82–83 [10] 81–83 [3] 82 [41] 80 [1]	354 706 [10]			

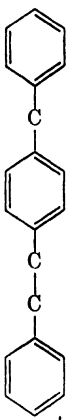
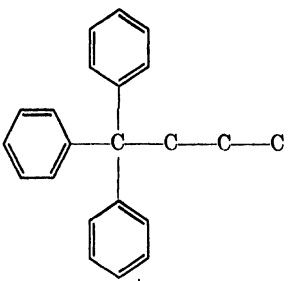
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Diphenyl-*m*-tolylmethane 				
60.3				
62[1,33] 61–62[25] 60.5–61.5[10,35] 60.2[15] 59.5[55] 59–59.5[24]	353–354.7 774[55]	1.0072 90°[15]	1.58264 90°[15] 1.57666 $n_{H\alpha}^{90}$ [15] 1.59824 $n_{H\beta}^{90}$ [15]	
Diphenyl-*p*-tolylmethane 				
72				
74[A] 72[12,18,21,41] 71[24,34] 69–70[9]				
1,2-Dibenzylbenzene 				
78[8,16,27,53] 67–68[62]				

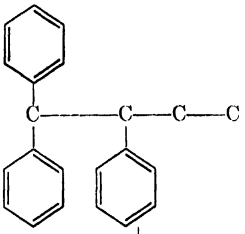
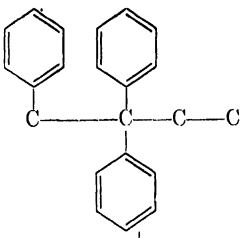
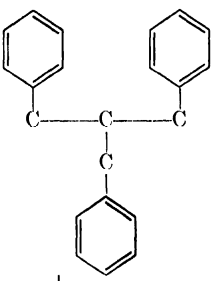
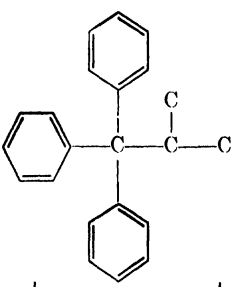
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3-Dibenzylbenzene 				
59[38] 58–59[64]	229–231 14[56]	1.0535 D_0^{20}[56] 1.0663 D_0^{0}[56]		
1,4-Dibenzylbenzene 				
86 87–87.5[56] 87[48] 85–87[53] 86[38] 85–86[37,64] 84–85[45] 84[50] 83–84[67] 83[16]	252–255 20[37]			

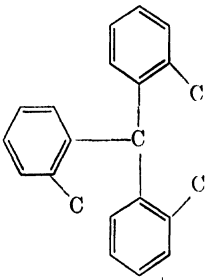
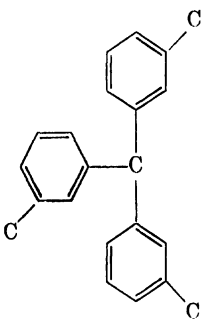
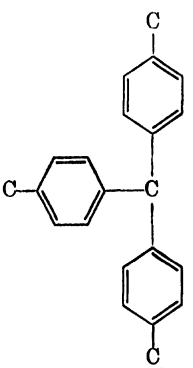
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,1-Triphenylpropane 				
51 [30]	248–249	41 [30]		
1,1,2-Triphenylpropane 				
76 [5] 73–75 [58]	365 [20] 220	16 [5]		
1,1,3-Triphenylpropane 				
47 [5] 46–47 [82,83] 46 [76]	225	21 [5]		
1,2,2-Triphenylpropane 				
118–119 [84] 116–117 [85]				

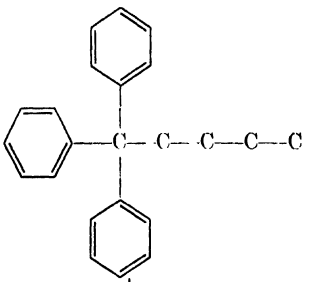
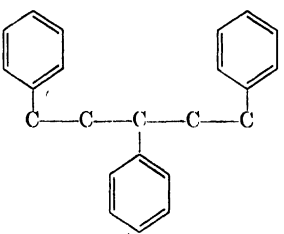
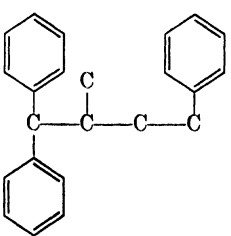
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,3-Triphenylpropane 	340[18] 225–230 10[26,63] 179–181 2[26]	1.0482 18°[26]	1.6042 23°[26]	
Diphenyl-2,4-dimethylphenylmethane 				
61.5[34]				
Diphenyl-2,5-dimethylphenylmethane 				
92[38]				

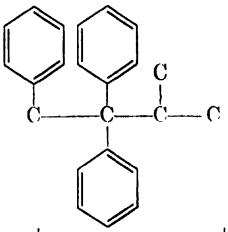
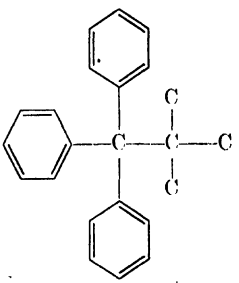
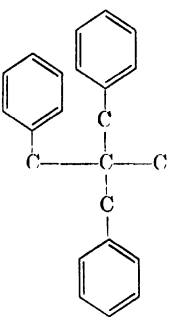
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Diphenyl-3,4-dimethylphenylmethane				
68.5 [34]				
Phenyldi-*o*-tolylmethane				
106 [16]	286–289 12 [16]			
104 [73]	180–185 12 [73]			
102–104 [3]	64 2 [16]			
Phenyldi-*p*-tolylmethane				
54				
55–56 [68]	218–220 12 [16]			
54–54.5 [40]	193 3 [16]			
53 [71]				
52 [31,42]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Methyldibenzylbenzene (a)				
	214–217 4 [35]	1.0413 [35]	1.5991 [35]	
(a) The structure of this compound is not given.				
Benzyltolylbenzene (a)				
	392–396 [72]	1.049(b) [72]		
(a) The structure of this compound is not given. (b) The temperature for this density is not given.				
1-Benzyl-4-phenethylbenzene 				
	225–230 10 [26] 213–216 5 [26]	1.0394 18° [26]	1.5929 23° [26]	
$C_{22}H_{22}$				
1,1,1-Triphenylbutane 				
79 [30]	262–265 62 [30]			

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,2-Triphenylbutane  77–78 [22]				
1,2,2-Triphenylbutane  79–79.5 [79]				
1,3-Diphenyl-2-benzylpropane  81.8–82 [36]				
1,1,1-Triphenyl-2-methylpropane 	233–234 21 [30]			

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Tri-*o*-tolylmethane 				
130.5–131.5 [3]				
Tri-*m*-tolylmethane 				
73 [55]	376–377.3 767 [55]			
Tri-*p*-tolylmethane 				
63.5 [28] 57 [44] 53–54 [47]	260–262 28 [60] 232 11 [8]			

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
p-Dimethyltriphenyldimethane (a)				
83.5[19]				
(a) The structure of this compound is not given.				
Benzyl-(phenylxylyl)-methane (a)				
	240–245 14[16]			
(a) The structure of this compound is not given.				
$C_{22}H_{24}$				
1,1,1-Triphenylpentane 				
153–154[48]				
1,3,5-Triphenylpentane 				
	170–172 0.5[65]	1.0180 25°[54]	1.5770 25°[54]	
1,1,4-Triphenyl-2-methylbutane 				
69[59]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,2-Triphenyl-3-methylbutane 				
80[59]	225–227 20[59]			
1,1,1-Triphenyl-2,2-dimethylpropane 				
189.5[75] 185[32]				
1-Phenyl-2,2-dibenzylpropane 				
113[70]				
Benzylphenyl-2,4,6-trimethylphenylmethane (a)				
76[16]				

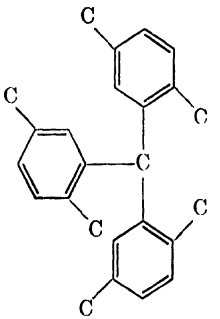
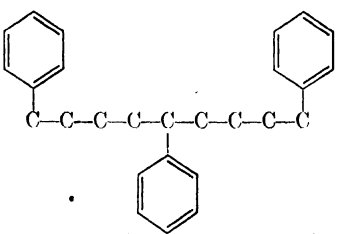
(a) The structure of this compound is questionable.

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Phenyl-di-2,5-dimethylphenylmethane				
92.5 [23]				
1,3,5-Trimethyl-2,4-dibenzylbenzene				
131 [42] 89 [46]				
$C_{24}H_{26}$				
1,2,4,5-Tetramethyl-3,6-dibenzylbenzene				
176–177 [26A]	495 [4]			

M. P., °C	B. P., °C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
2,3,5,6-Tetramethyl-2′-benzyldiphenylmethane							
126.5–127.5 [26A]							
2,3,5,6-Tetramethyl-4′-benzyldiphenylmethane							
69–70 [26A]							
$C_{25}H_{28}$							*
1,5-Diphenyl-3-phenethylpentane							
			1.0086		1.5725		†
−32 [57]	209.5	1.00 [57]	1.0087 [57]		1.5725 [57]		
	195.0	0.50 [57]	0.9537	98.9° [57]	1.5644	40.0° [57]	
			0.9801	60° [57]	1.5685	30.0° [57]	
			0.9952	37.8° [57]			

* $\frac{dD}{dt} = -0.0007407[1 - 0.0001579(t - 20)]/°C$ (20 to 99°C)

† $\frac{dn}{dt} = -0.0004035/°C$ (20 to 40°C)

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Tri-2,5-dimethylphenylmethane 				
188[23]				
$C_{27}H_{32}$				
1,5,9-Triphenylnonane 				
	216–218 0.04[54]	0.9955 25°[54]	1.5580 25°[54]	

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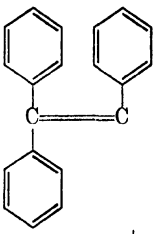
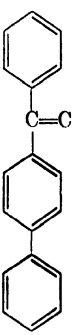
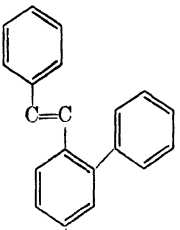
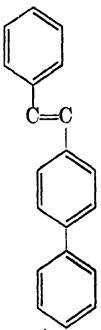
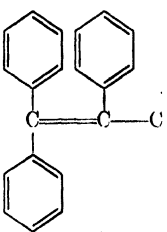
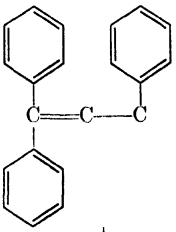
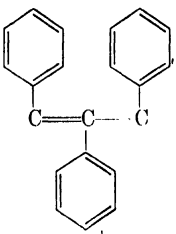
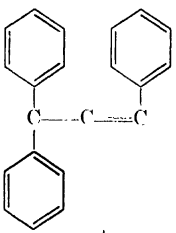
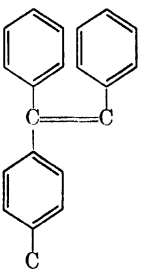
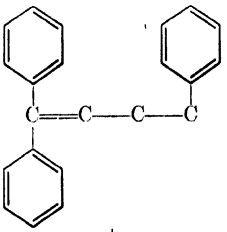
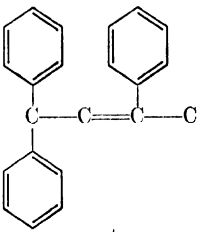
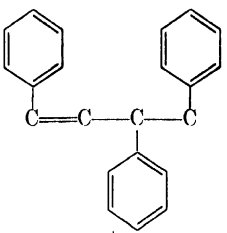
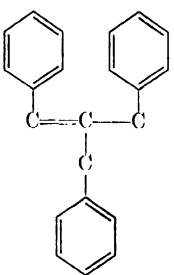
3. THREE PHENYL OR ONE PHENYL AND ONE BIPHENYLYL SUBSTITUTIONS ON ALKENES, C_nH_{2n-24}

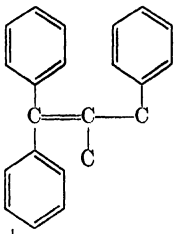
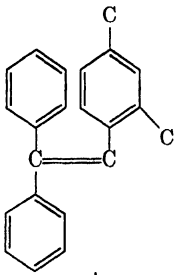
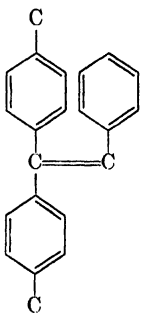
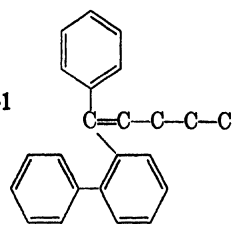
M. P., °C	B. P., °C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1,1,2-Triphenylethene 							*
70			1.0757				
72–73 [42]	219–221	15 [47]	1.0373	78.4° [47]	1.66784	25° [25]	
72 [25,43]	220–221	14 [17]	1.0649	35° [25]	1.62918	$n_{H\alpha}^{78.4}$ [47]	
70–71 [14,26]			1.0684	30° [25]	1.65698	$n_{H\alpha}^{25}$ [25]	
70–70.5 [15]			1.0712	26° [25]	1.66798	$n_{H\beta}^{78.4}$ [47]	
70 [21,22]			1.0719	25° [25]	1.69840	$n_{H\beta}^{25}$ [25]	
69 [41]			1.0726	24.5° [25]	1.64012	$n_{He}^{78.4}$ [47]	
68–69 [1,13]			1.0750	21° [25]			
67–69 [47]			1.0765	19° [25]			
68 [27,44]			1.0793	15° [25]			
67–68 [12]			1.0813	12° [25]			
66–68 [18]							
* $\frac{dD}{dt} = -0.0007200/°C$	(12 to 35°C)						
1-Phenyl-1-*p*-biphenylylethene 							
95							
96 [40]							
94–95 [32]							
94 [40]							
93 [9]							

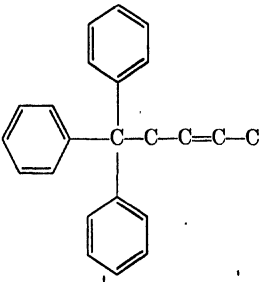
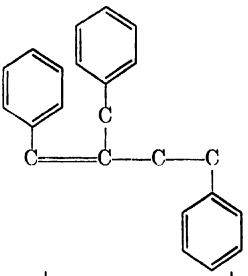
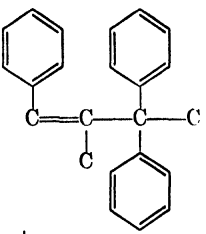
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-2-*o*-biphenylethene 				
59–61[7] 55–56[8]	201–202.5 12[7]			
1-Phenyl-2-*p*-biphenylylethene 				
220.5–221.5[20]				
$C_{21}H_{18}$ **1,1,2-Triphenylpropene-1** 				
92–93[26] 89–90[23,24]		0.9956 100.2°[47]	1.58414 $n_{H\alpha}^{100.2}$[47] 1.61146 $n_{H\beta}^{100.2}$[47] 1.59253 $n_{He}^{100.2}$[47]	

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,3-Triphenylpropene-1 				
	229–230 17 [29]			
89 [36,37]	225–227 16 [3]			
87–89 [31]	228–229 15 [21]			
	222 10 [39]			
1,2,3-Triphenylpropene-1 				
63–64 [37]	224 12 [5]			
63 [5,36]				
62–63 [28]				
1,1,3-Triphenylpropene-2 				
97–98 [50]	230 15 [50]			
	180 0.2 [50]			
1,2-Diphenyl-1-*p*-tolylethene 				
	245–250 27 [19]			

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-*p*-Tolyl-2-*p*-biphenylylethene				
102–103 [3]				
$C_{22}H_{20}$				
1,1,2-Triphenylbutene-1				
80–81 [10]				
1,1,3-Triphenylbutene-1				
	244	33 [51]		
1,1,1-Triphenylbutene-3				
69.5–70.5 [1]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,4-Triphenylbutene-1  122–124[48] 122–123[16]				
1,1,3-Triphenylbutene-2 	234 12[51]			
1,3,4-Triphenylbutene-1 	240–242 40[4]			
1,3-Diphenyl-2-benzylpropene-1  29–30[45,46]	241–245 20[45] 245–246 18[5] 231–232 11[29,45]			

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,3-Triphenyl-2-methylpropene-1 				
70–71[6]				
1,1-Diphenyl-2-(2′,4′-dimethylphenyl)-ethene 				
69–70[11]				
1,1-Di-*p*-tolyl-2-phenylethene 				
	258–259 24[19]			
$C_{23}H_{22}$				
1-Phenyl-1-(2′-*o*-biphenylyl)-pentene-1 				
78–79[8]	207–208[8]			

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,1-Triphenylpentene-3 				
83(a) [49] 124(b) [49]				
(a) This constant was determined on the *cis* isomer. (b) This constant was determined on the *trans* isomer.				
1,4-Diphenyl-2-benzylbutene-1 				
57–58 [30]	245–247 22 [30]			
1,3,3-Triphenyl-2-methylbutene-1 				
110(a) [33,34,35] 90(a) [33,34]				
(a) These melting points represent two stereoisomers.				

M. P., °C	B. P., °C @ 760mm		D_4^{20}		n_D^{20}		Additional Data
1-(2′,4′-Dimethylphenyl)-2-benzyl-3-phenylpropene-1							
	246	13[11]	1.028	24°[11]	1.600	24°[11]	
$C_{25}H_{26}$							*
1,5-Diphenyl-3-phenethylpentene-2							
			1.0159		1.5816		†
	210.5	1.00[38]	1.0159[38]		1.5816[38]		
	195.5	0.50[38]	0.9611	98.9°[38]	1.5735	40.0°[38]	
			0.9880	60°[38]	1.5775	30.0°[38]	
			1.0029	37.8°[38]			
			1.0304	0°[38]			

$* \frac{dD}{dt} = -0.0007166[1 - 0.0008158(t - 20)]/°C$ (0 to 99°C)

$† \frac{dn}{dt} = -0.000405/°C$ (20 to 40°C)

References on Three Phenyl or One Phenyl and One Biphenylyl Substitutions on Alkenes

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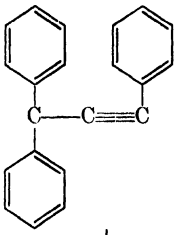
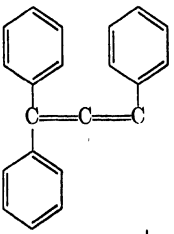
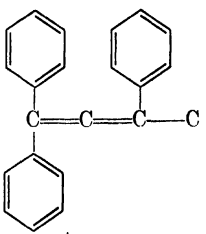
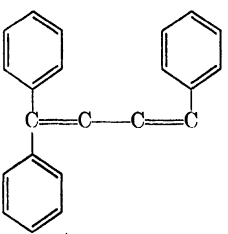
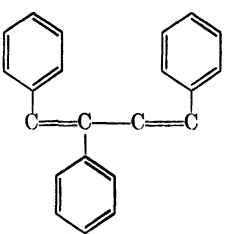
4. THREE PHENYL SUBSTITUTIONS ON ALKYNES, C_nH_{2n-26}

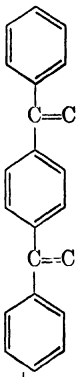
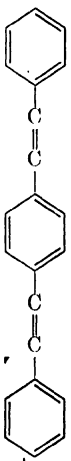
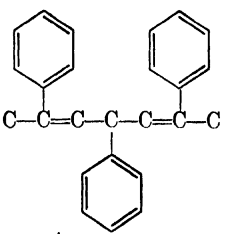
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,3-Triphenylpropyne-2 				
79[1]				

References on Three Phenyl Substitutions on Alkynes

1. Wieland, H., and H. Kloss, Ann. 470, 201 1929.

5. THREE PHENYL SUBSTITUTIONS ON ALKADIENES OR TWO PHENYLALKENYL SUBSTITUTIONS ON BENZENE, C_nH_{2n-26}

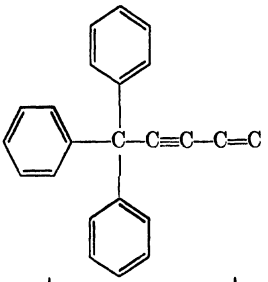
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Triphenylpropadiene  210[5,7]				
$C_{22}H_{18}$ **1,1,3-Triphenylbutadiene-1,2**  102[8]				
1,1,4-Triphenylbutadiene-1,3  101.5–102[6]				
1,2,4-Triphenylbutadiene-1,3  103–104[2]				

M. P., °C	B. P., °C @ 760mm	D_4^{20} p	n_D^{20}	Additional Data
1,4-Di-(1′-phenethenyl)-benzene 138–139[1]				
1,4-Di-(2′-phenethenyl)-benzene 258[4]				
$C_{25}H_{24}$ 2,4,6-Triphenylheptadiene-2,5 145[3]				

References on Three Phenyl Substitutions on Alkadienes or Two Phenylalkenyl Substitutions on Benzene

1. Bergmann, E., and A. Bondi, Ber. **64**, 1455 1931.
2. Bergmann, E., and T. Ukai, Ber. **66**, 54 1933.
3. Delacre, M., Bull. classe sci., Acad. roy. Belg. [3] **22**, 470 1891.
4. Kauffmann, H., Ber. **50**, 515 1917.
5. Meyer, K. H., and K. Schuster, Ber. **55**, 815 1922.
6. Staudinger, H., Ber. **42**, 4249 1909.
7. Ziegler, K., K. Richter, and B. Schnell, Ann. **443**, 161 1925.
8. Ziegler, K., and W. Sauermilch, Ber. **63**, 1851 1930.

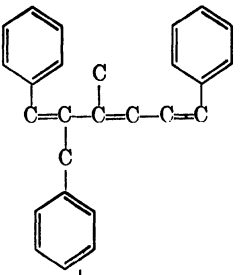
6. THREE PHENYL SUBSTITUTIONS ON ALKENYNES, C_nH_{2n-28}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,1-Triphenylpenten-4-yne-2 				
134–135[1]				

References on Three Phenyl Substitutions on Alkenynes

1. Carothers, W. H., and G. J. Berchet, J. Am. Chem. Soc. 55, 1094 1933.

7. THREE PHENYL SUBSTITUTIONS ON ALKATRIENES, C_nH_{2n-28}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,6-Diphenyl-2-benzyl-3-methylhexatiene-1,3,5 				
117[1]				

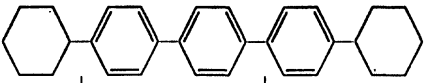
References on Three Phenyl Substitutions on Alkatrienes

1. Reimer, M., and G. P. Reynolds, Am. Chem. J. 48, 206 1913.

X. TERPHENYLS WITH ALICYCLIC SUBSTITUTIONS

1. Terphenyls with Two Cyclyl Substitutions C_nH_{2n-18}

1. TERPHENYLS WITH TWO CYCLYL SUBSTITUTIONS, C_nH_{2n-26}

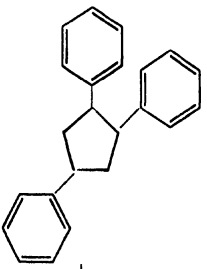
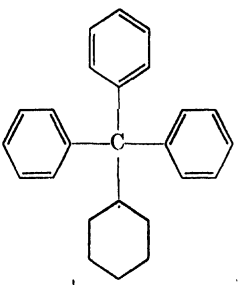
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4′,4″-Dicyclohexylterphenyl 				
	270 2.5[1]			

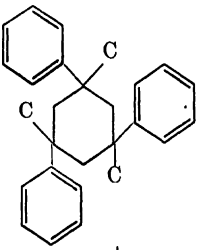
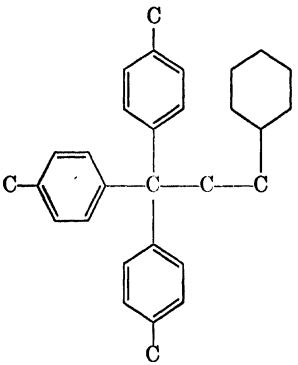
References on Terphenyl with Two Cyclyl Substitutions

1. Buu-Hoï and P. Cagniant, Compt. rend. 216, 381 1943; C.A. 38, 2334 1944.

XI. THREE PHENYL OR ONE PHENYL AND ONE BIPHENYLYL SUBSTITUTIONS ON ALICYCLICS

1. Three Phenyl Substitutions on Cyclanes or Cyclylalkanes C_nH_{2n-24}
2. Three Phenyl Substitutions on Cyclenes C_nH_{2n-26}
3. Three Phenyl or One Phenyl and One Biphenylyl Substitutions on Cyclodienes C_nH_{2n-28}
4. Three Phenyl Substitutions on Alkylidenecyclodienes C_nH_{2n-30}

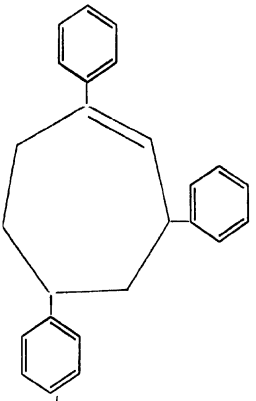
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,4-Triphenylcyclopentane 	285 50[2,6]			
$C_{24}H_{24}$				
Triphenylmethylcyclopentane (a)				
121–122(b)[1]	260–262 28(b)[1]			
(a) The structure of this compound is not given. (b) The melting and boiling points represent two different isomeric forms.				
$C_{25}H_{26}$				
Triphenyldimethylcyclopentane (a)				
80–81(b)[1]	246–248 25(b)[1]			
(a) The structure of this compound is not given. (b) The melting and boiling points represent two different isomeric forms.				
Cyclohexyltriphenylmethane 				
143–145[5]				

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3,5-Triphenyl-1,3,5-trimethylcyclohexane 				
	172-178 0.1[3]	1.0455[3]	1.58429[3]	
$C_{30}H_{36}$				
1,1,1-Tri-*p*-tolyl-3-cyclohexylpropane 				
126[4]				

References on Three Phenyl Substitutions on Cyclanes or Cyclylalkanes

1. Abell, R. D., J. Chem. Soc. **83**, 367 1903.
2. Newmann, F. H., Ann. **302**, 236 1898.
3. Staudinger, H., and F. Breusch, Ber **62**, 442 1929.
4. Wieland, H., and K. Kloss, Ann. **470**, 201 1929.
5. Wieland, H., and A. Meyer, Ann. **551**, 249 1942; C.A. **37**, 5048 1942.
6. Wislicenus, J., and F. H. Newmann, Ann. **302**, 236 1898.

2. THREE PHENYL SUBSTITUTIONS ON CYCLENES, C_nH_{2n-26}

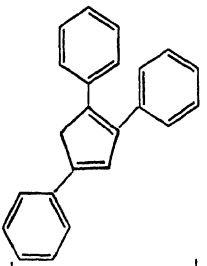
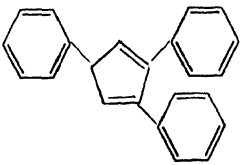
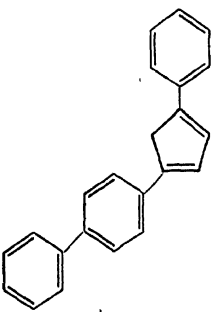
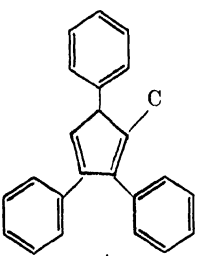
M. P. °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3,5-Triphenylcycloheptene-1 (Tetrahydromerodypnopinacolene) 				
145(a)[1] 115(a)[1]				

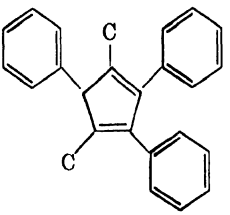
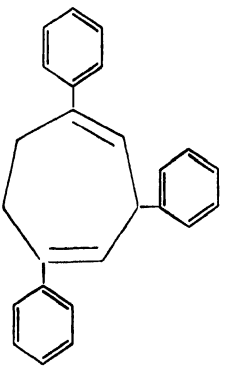
(a) These melting points represent two different forms of the compound.

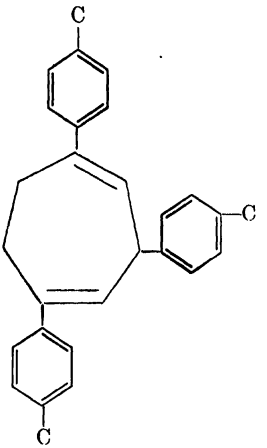
References on Three Substitutions on Cyclenes

1. Delacre, M., Ann. chim [9] 2, 63 1914.

3. THREE PHENYL OR ONE PHENYL AND ONE BIPHENYLYL SUBSTITUTIONS ON CYCLODIENES, C_nH_{2n-28}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,4-Triphenylcyclopentadiene-1,3 				
149–150[4] 149[8]				
2,3,5-Triphenylcyclopentadiene-1,3 				
149[9]				
1-Phenyl-4-*p*-biphenylylcyclopentadiene-1,3 				
217–218[5]				
$C_{24}H_{20}$ **1,3,4-Triphenyl-2-methylcyclopentadiene-2,4** 				
162–163[1,2]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3,4-Triphenylcyclohexadiene (a)				
111[7]				
(a) The structure of this compound is not given.				
$C_{25}H_{22}$				
1,4-Dimethyl-2,3,5-triphenylcyclopentadiene-1,3 				
127–128[1]				
1,3,5-Triphenylcycloheptadiene-1,4 (Dihydromerodypnopinacolene) 				
135–136[3] 94–95[6]				

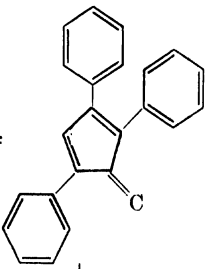
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3,5-Tri-*p*-tolylcycloheptadiene-1,4 (a) 				
122[6]				

(a) This structure is probable, although no structure was definitely assigned by the author.

References on Three Phenyl or One Phenyl and One Biphenylyl Substitutions on Cyclodienes

1. Abell, R. D., J. Chem. Soc. **83**, 367 1903.
2. Abell, R. D., Proc. Chem. Soc. **19**, 18 1903.
3. Delacre, M., Ann. chim. [9] **2**, 63 1914.
4. Dilthey, W., and W. Schommer, J. prakt. Chem. [2] **136**, 293 1933.
5. Drake, N. L., and J. R. Adams, J. Am. Chem. Soc. **61**, 1326 1939.
6. Gastaldi, C., Gazz. chim. ital. **51**, II, 289 1921.
7. Kohler, E. P., Am. Chem. J. **37**, 369 1907.
8. Newmann, F. H., Ann. **302**, 236 1898.
9. Wislicenus, J., and F. H. Newmann, Ann. **302**, 236 1898.

4. THREE PHENYL SUBSTITUTIONS ON ALKYLIDENECYCLODIENES, C_nH_{2n-30}

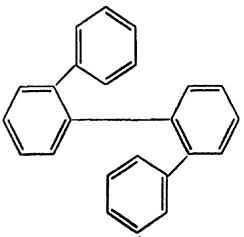
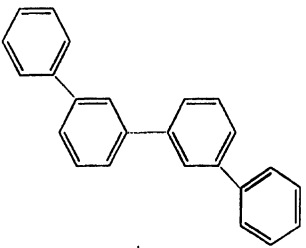
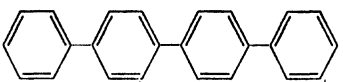
M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,4-Triphenyl-3-methylenecyclopentadiene-1,4 				
148[1]				

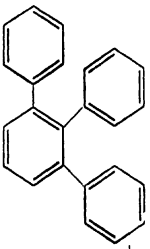
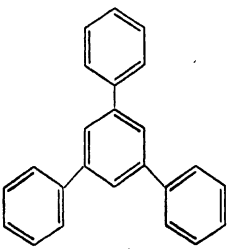
References on Three Phenyl Substitutions on Alkylidenecyclodienes

1. Dilthey, W., and P. Huchtemann, J. prakt. Chem. [2] 154, 238 1940.

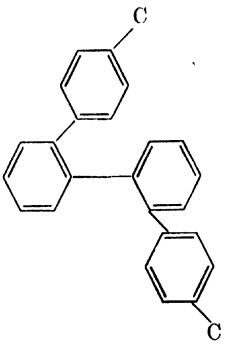
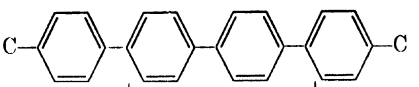
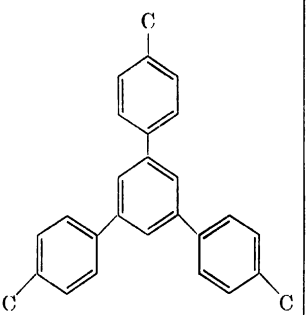
XII. QUATRAPHENYLS AND THEIR ALIPHATIC DERIVATIVES

1. Quatraphenyls and Their Alkyl Derivatives C_nH_{2n-20}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2′-Diphenylbiphenyl 				
118–119[6,40] 117–119[44] 118[2,32]	420[2] 193–195 1[44]			
3,3′-Diphenylbiphenyl 				
86[6]				
4,4′-Diphenylbiphenyl (Quaterphenyl) (Benzerythrene) 				
318				
320[3,6,7,13,15,29,53] 318–319[46] 318[25] 317[14,19,34] 313–314[26] 312[17] 310[33,38] 308[30,34] 307–308[43,47]	520[34] 428 18[34]			

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,3-Triphenylbenzene 				
157[50]				
1,3,5-Triphenylbenzene 				
173.7				
174.3–174.5[4,18]	459 717[34]	1.199 30.3°[4]		
174.2–174.5[18]		1.200 30.3°[4]		
173–174[27]		1.200 (solid)(a)[4]		
172–173[1]		1.201 (solid)(a)[4]		
172[21,29,35,37,48]		1.205 (solid)(a)[49]		
171–172[45]		1.206 (solid)(a)[19,49]		
171[5,19,54]		1.205 0°[56]		
170–171[36,52]				
170[8,16,22,28,34]				
169.5–170[31]				
169–170[12,23,41,42,51]				
169[20,55]				
168–169[10]				
168[11]				

(a) The temperature of these densities is not given.

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2′-Di-*p*-tolylbiphenyl 				
113–114 [44]				
4,4′-Di-*p*-tolylbiphenyl 				
334 [39]				
$C_{27}H_{24}$ 1,3,5-Tri-*p*-tolylbenzene 				
171 [9] 170 [5,11]				

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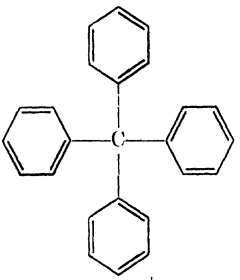
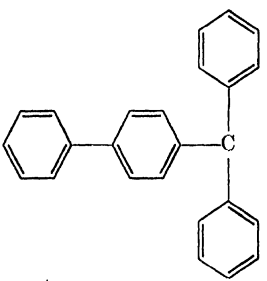
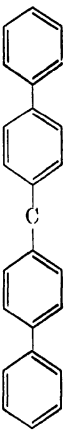
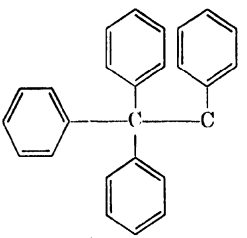
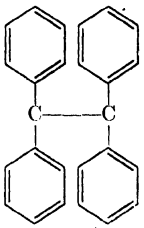
XIII. FOUR PHENYL, TWO PHENYL AND ONE BIPHENYLYL, OR TWO BIPHENYLYL SUBSTITUTIONS ON ALIPHATICS.

1. Four Phenyl, Two Phenyl and One Biphenylyl, or Two Biphenylyl Substitutions on Alkanes C_nH_{2n-30}
2. Four Phenyl, Two Phenyl and One Biphenylyl, or Two Biphenylyl Substitutions on Alkenes C_nH_{2n-32}
3. Four Phenyl or Two Biphenylyl Substitutions on Alkynes C_nH_{2n-34}
4. Four Phenyl or Two Biphenylyl Substitutions on Alkadienes C_nH_{2n-34}
5. Four Phenyl Substitutions on Alkatrienes C_nH_{2n-36}
6. Four Phenyl Substitutions on Alkadiynes C_nH_{2n-38}
7. Four Phenyl Substitutions on Alkatetraenes C_nH_{2n-38}
8. Four Phenyl Substitutions on Alkapentaenes C_nH_{2n-40}
9. Four Phenyl Substitutions on Alkahexaenes C_nH_{2n-42}

1. FOUR PHENYL, TWO PHENYL AND ONE BIPHENYLYL, OR TWO BIPHENYLYL SUBSTITUTIONS ON ALKANES, C_nH_{2n-30}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Tetraphenylmethane 				
282.5				
285 [22,25]	429 [7]			
283 [62]	429 735 [77]			
282 [77]				
281.5–282 [45]				
281–282 [82]				
281.5 [41]				
281 [7]				
280–281 [32]				
Diphenyl-*p*-biphenylylmethane 				
112–113 [60]		1.161 0° [90]		

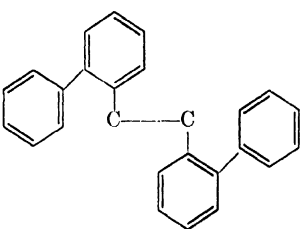
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Di-*p*-biphenylylmethane 				
161[1,2,43] 159[42] 158–159[83]	360[1]	1.178[43] 1.176 0°[90]		
$C_{26}H_{22}$ **1,1,1,2-Tetraphenylethane** 				
143 144[26,61] 143–144[80] 142–143[27] 140–142[63] 140–141[38] 140[79]	277–280 21[27]			

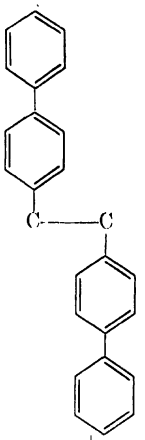
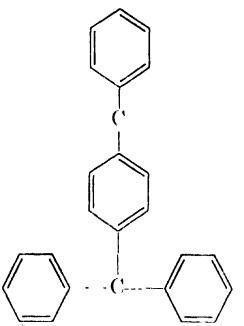
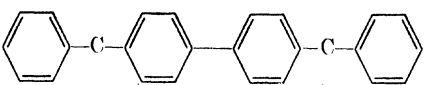
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,2,2-Tetraphenylethane 				
209.2				
211–212[68]	379–383[11,12,91]	1.170 0°[90]		
211–211.5[6]	277–280 21[91]	1.182 (solid)(c)[64]		
211[44,53,54,55]	260 16[44]			
209–211[18]				
210[35]				
209–210[30,57]				
208–210[37,51]				
209.5[5]				
209(a)				
208–209(b)				
207–208.5[16]				
208[3,86]				
207–208[4]				
206.5–208[33]				
206–208[4]				
207.5[12]				
207[8,23,75]				
205–207[36]				
206[17,22,29,76]				
205–206[39,71,72,74]				

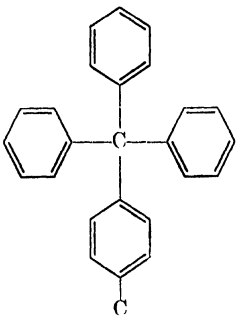
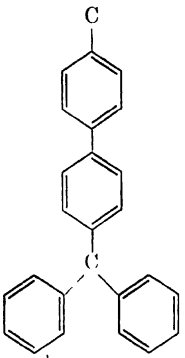
(a) The melting point 209 is found in references 10, 13, 14, 21, 31, 34, 40, 46, 47, 48, 49, 50, 52, 56, 58, 87, 88, 91.

(b) The melting point 208-209 is found in references 15, 59, 65, 66, 69, 70, 73, 89.

(c) This density is the average of two determinations. The temperature for this density is not given.

1,2-Di-*o*-biphenylylethane 				
	260 12[78]			

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Di-*p*-biphenylylethane 				
198–199 [84]				
Diphenyl-*p*-benzylphenylmethane 				
78–78.5 [9]				
Methyldiphenylbenzylbenzene (a)				
125 [20]				
(a) The structure of this compound is not given.				
4,4′-Dibenzylbiphenyl 				
114–115 [19] 113 [24,67,85]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Triphenyl-*p*-tolylmethane  163 [31]				
4-Methyl-4′-benzhydrylbiphenyl  131 [28]				

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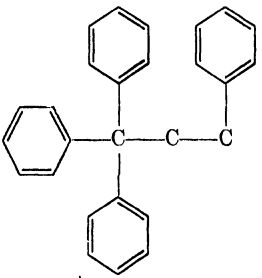
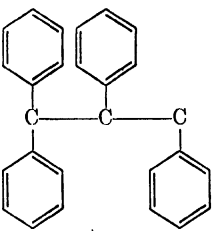
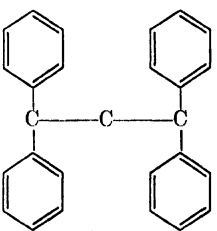
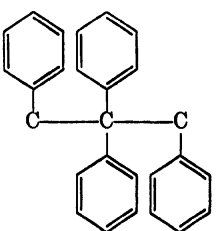
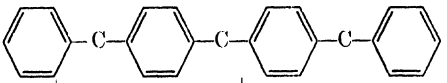
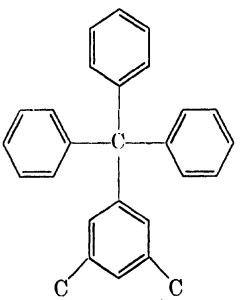
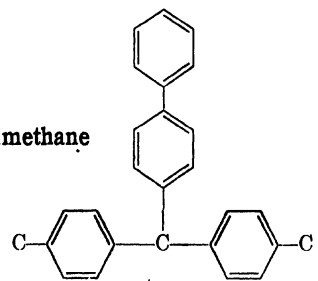
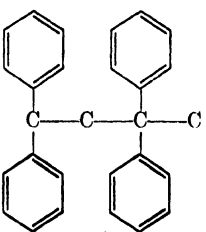
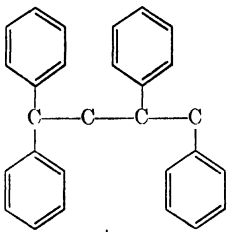
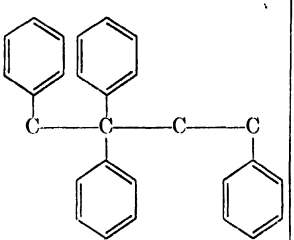
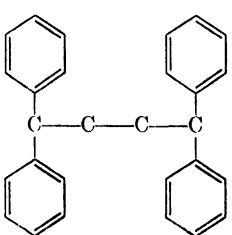
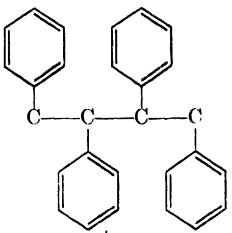
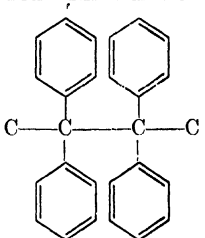
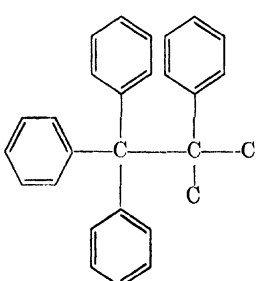
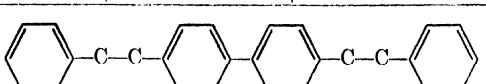
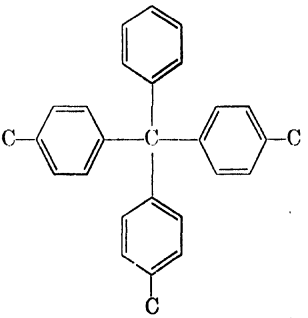
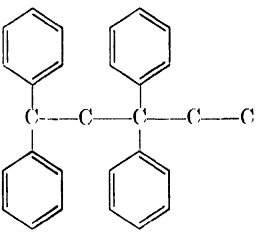
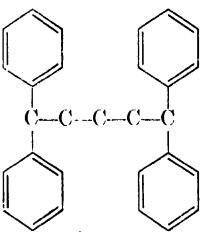
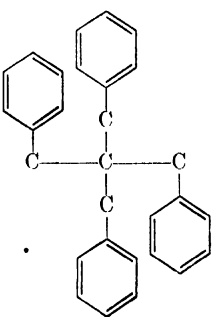
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,1,3-Tetraphenylpropane  126 [35] 125–126 [25]				
1,1,2,3-Tetraphenylpropane  121 [20] 87–89 [8]				
1,1,3,3-Tetraphenylpropane  139 [34] 135–136 [41]				
1,2,2,3-Tetraphenylpropane  125–127 [45]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4,4′-Dibenzyldiphenylmethane 				
91.5[16]				
Triphenyl-3,5-dimethylphenylmethane 				
154[5]	450[5]			
Di-*p*-tolyl-*p*-biphenylylmethane 				
123–125[2]				
$C_{28}H_{26}$				
1,1,3,3-Tetraphenylbutane 				
122[7] 118[46]				

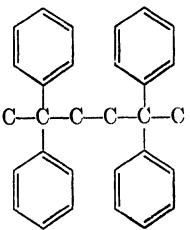
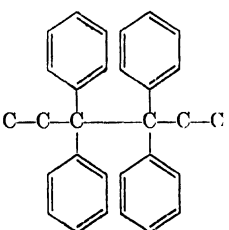
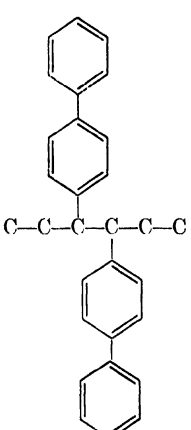
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,3,4-Tetraphenylbutane 	270–273 21 [25]			
1,2,2,4-Tetraphenylbutane  172 [25]				
1,1,4,4-Tetraphenylbutane  121 122 [23] 121–122 [24] 121(a) 120 [48] 118–119.5 [42]				

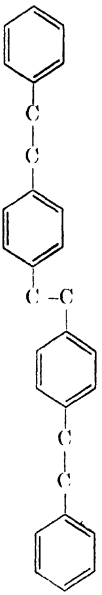
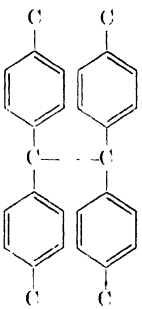
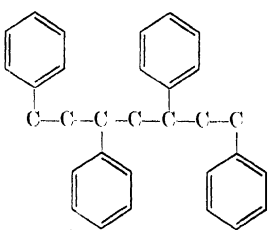
(a) The melting point 121 is found in references 9, 10, 21, 31, 32, 35, 47.

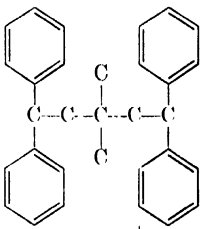
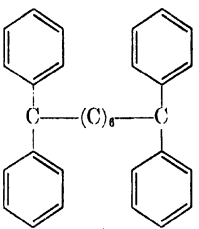
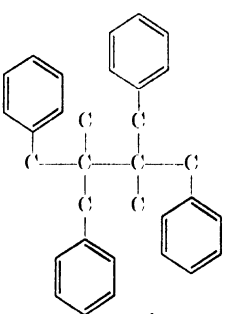
M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,3,4-Tetraphenylbutane 				
255 [4,17] 254–255 [3] 251.5–252.0 [29]				
2,2,3,3-Tetraphenylbutane 				
126–127 [49]				
1,1,1,2-Tetraphenyl-2-methylpropane 				
	272 [37]			
4,4′-Diphenethylbiphenyl 				
146 [27]				

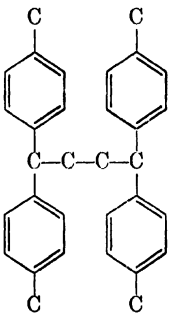
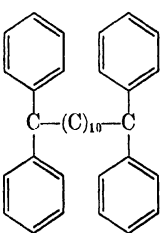
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Phenyltri-*p*-tolylmethane  177-178 [26]				
$C_{29}H_{28}$ **1,1,3,3-Tetraphenylpentane**  128 [46]				
1,1,5,5-Tetraphenylpentane  80 [6] 79-80 [41]				
1,3-Diphenyl-2,2-dibenzylpropane  164 [18,30]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Di-*p*-biphenylyl-2,2-dimethylpropane 178–179[15]				
Tetra-*p*-tolylmethane 132[36]				
$C_{30}H_{30}$ 1,1,6,6-Tetraphenylhexane 125 126–127[35] 124.5–126[40] 124–125.5[19] 124–125[33] 123–124[6]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2,5,5-Tetraphenylhexane 				
110[23]				
3,3,4,4-Tetraphenylhexane 				
85-86[49]				
3,4-Di-*p*-biphenylylhexane 				
254[13]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-(Di-4′-phenethylphenyl)-ethane  97–98 [39]				
1,1,2,2-Tetra-*p*-tolylethane  278–279 [1]				
$C_{31}H_{32}$ **1,3,5,7-Tetraphenylheptane** 	260–262 3 [28]	1.0452 25° [22]	1.5960 [22]	

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,5,5-Tetraphenyl-3,3-dimethylpentane 				
88–89 [41]				
$C_{32}H_{34}$				
1,1,8,8-Tetraphenyloctane 				
120–121.5 [43]				
Tetraphenyldipropylethane (a)				
70 (in N_2) [50]				
(a) The structure of this compound is not given.				
Tetraphenyldiisopropylethane (a)				
140–141 (in N_2) [50]				
(a) The structure of this compound is not given.				
1,4-Diphenyl-2,3-dimethyl-2,3-dibenzylbutane 				
171 [30]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,4,4-Tetra-*p*-tolylbutane 				
126[11,12]				
$C_{34}H_{38}$				
Tetraphenyldibutylethane (a)				
67–68 (in N_2)[50]				
62–63[50]				
(a) The structure of this compound is not given.				
Tetraphenyldi-*tert*-butylethane (a)				
138–141 (in N_2)[14]				
(a) The structure of this compound is not given.				
$C_{36}H_{42}$				
1,1,12,12-Tetraphenyldodecane 				
74–75[44]				

References on $C_{27}H_{24}$-$C_{36}H_{42}$ Compounds

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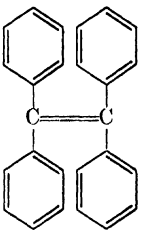
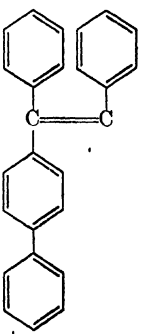
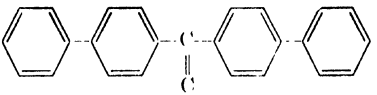
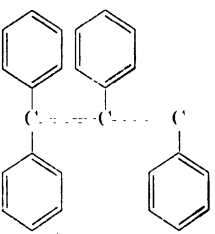
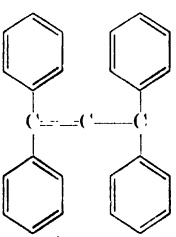
2. FOUR PHENYL, TWO PHENYL AND ONE BIPHENYLYL, OR TWO BIPHENYLYL SUBSTITUTIONS ON ALKENES, C_nH_{2n-32}

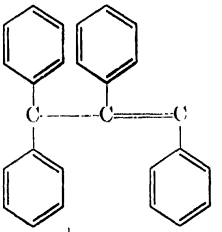
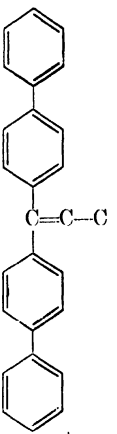
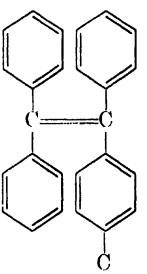
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Tetraphenylethene 				
222.4				
225[87]	425[19]	1.155 0°[88]		
224.6–224.9[63]				
223.5–224.5[9,28]				
224[43]				
223–224[34,58]				
222.8[50]				
222[4,6,54]				
221–222[75,78,80]				
220–222[48]				
221(a)				
220–221[5,41,49]				
219–221[10]				
220(b)				
219[20,51,57]				

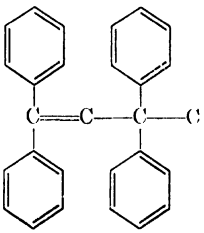
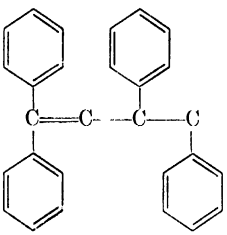
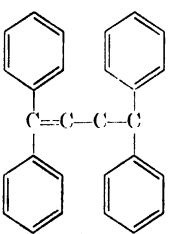
(a) The melting point 221 is found in references 1, 2, 15, 16, 19, 21, 24, 26, 27, 38, 39, 40, 42, 44, 46, 47, 60, 64, 66, 69, 73, 77, 81.

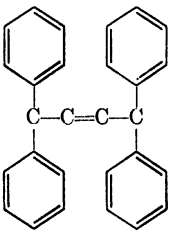
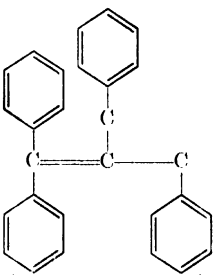
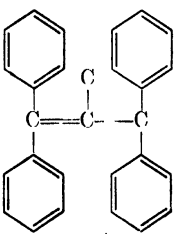
(b) The melting point 220 is found in references 17, 18, 22, 53, 59, 65, 68.

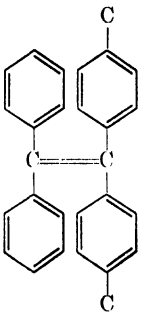
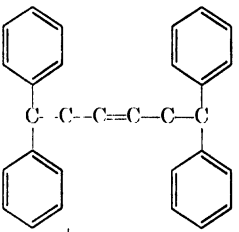
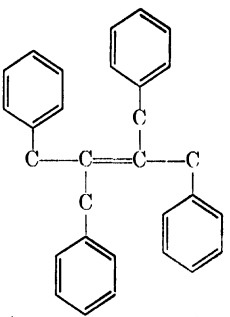
1,2-Diphenyl-1-*p*-biphenylylethene 				
134–135[55]				

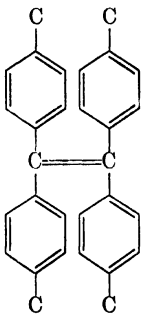
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Di-*p*-biphenylylethene 				
211 [52,54] 204–205.5 [79]				
1,2-Di-*p*-biphenylylethene				
198.5–200 [62]				
$C_{27}H_{22}$				
1,1,2,3-Tetraphenylpropene-1 				
142 [8] 139 [45]				
1,1,3,3-Tetraphenylpropene-1 				
127				
128–129 [82] 127–128 [72,84] 126–127 [12] 125–127 [70] 125 [54] 124 [7]		1.135 0° [83]		

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,2,3-Tetraphenylpropene-2  131 [8]				
1,1-Di-*p*-biphenylylpropene-1  165–166 [52]				
1,1,2-Triphenyl-2-*p*-tolylethene  153 [68] 150–151 [29]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,3,3-Tetraphenylbutene-1 				
113.5 [35,36] 113 [7] 112 [25] 111 [54]				
1,1,3,4-Tetraphenylbutene-1 				
63 [56]	270–275 19 [56] 260–265 14 [56]			
1,1,2,3-Tetraphenylbutene (a)				
104–106 [38]				
(a) The position of the double bond is not given.				
1,1,4,4-Tetraphenylbutene-1 				
97–98 [76]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,4,4-Tetraphenylbutene-2 				
140–141(a)[11] 140.5(a)[54] 139–140[31] 132–133[79] 126.5–127.5(a)[11] 123–124(a)[54]				
(a) These melting points represent two different isomers.				
Distilbene (a)				
163[14] 118–119[74]				
(a) The structure of this compound is not given.				
1,1,3-Triphenyl-2-benzylpropene-1 				
78[54]				
1,1,3,3-Tetraphenyl-2-methylpropene-1 				
132–133[32]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Diphenyl-2,2-di-*p*-tolylethene 				
161 [6]				
$C_{30}H_{28}$				
1,1,6,6-Tetraphenylhexene-3 				
79–80 [30]				
1,4-Diphenyl-2,3-dibenzylbutene-2 				
	304 [43]			

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Tetra-*p*-tolylethene 				
151 [28,67] 142 [3]				
Tetratolyethene (a)				
215 [61]				
(a) The structure of this compound is not given.				
$C_{32}H_{32}$ **1,1,4,4-Tetratolylbutene** (a)				
151 [13]				
(a) The double bond is in either the 1 or the 2 position.				
$C_{34}H_{36}$ **Tetradimethylphenylethene** (a)				
244–245 [61]				
(a) The structure of this compound is not given.				

References on Four Phenyl, Two Phenyl and One Biphenylyl, or Two Biphenylyl Substitutions on Alkenes

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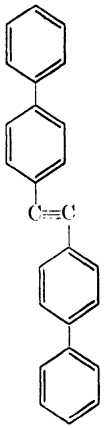
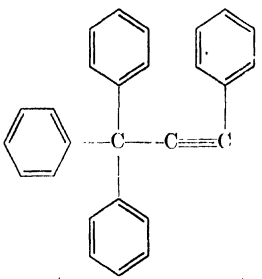
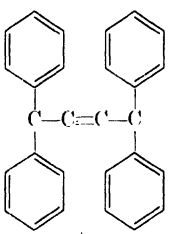
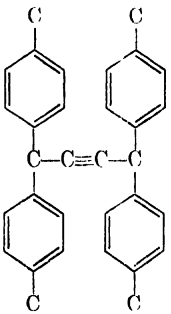
3. FOUR PHENYL OR TWO BIPHENYLYL SUBSTITUTIONS ON ALKYNES, C_nH_{2n-34}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Di-*p*-biphenylylethyne  243–244 [4]				
$C_{27}H_{20}$ 1,1,1,3-Tetraphenylpropyne-2  139 [5]				
$C_{28}H_{22}$ 1,1,4,4-Tetraphenylbutyne-2  116 [1] 114–115 [2] 114 [5]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Phenyltri-*p*-tolylpropyne (a)				
141 [5]				
(a) The structure of this compound is not given.				
$C_{32}H_{30}$				
1,1,4,4-Tetra-*p*-tolylbutyne-2 				
123 [3]				

References on Four Phenyl or Two Biphenylyl Substitutions on Alkynes

1. Brand, K., Ber. **54**, 1987 1921.
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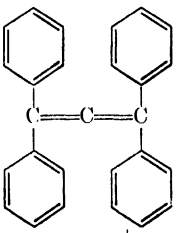
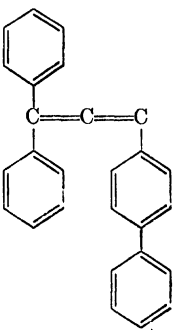
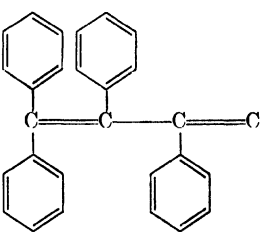
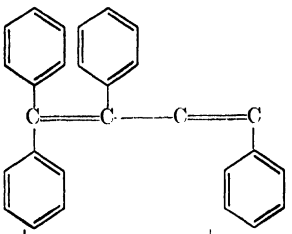
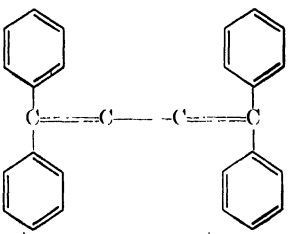
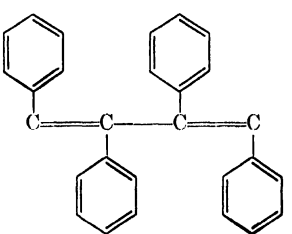
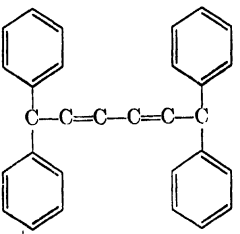
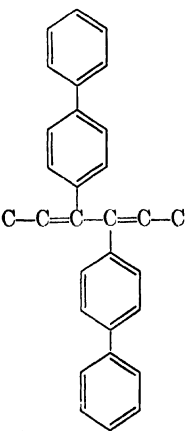
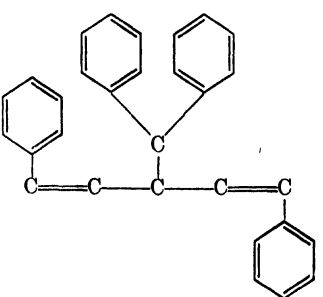
4. FOUR PHENYL OR TWO BIPHENYLYL SUBSTITUTIONS ON ALKADIENES, C_nH_{2n-34}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Tetraphenylpropadiene 				
165				
166[25]				
165[27]				
164–165[7,22,30]				
164[23,40]				
1,1-Diphenyl-3-*p*-biphenylylpropadiene 				
139–140[4]				
$C_{28}H_{22}$				
1,1,2,3-Tetraphenylbutadiene-1,3 				
118.5–120[17]				

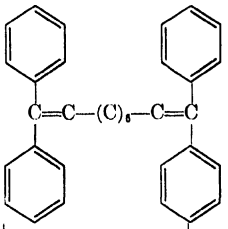
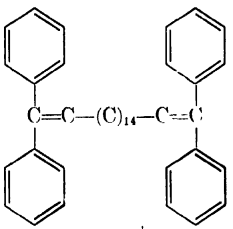
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,2,4-Tetraphenylbutadiene-1,3 				
148–149 [5] 146–148 [26]				
1,1,4,4-Tetraphenylbutadiene-1,3 				
202.6 205–206 [19] 203–204 [20,24] 202 [1,8,9,23,29,31] 201–202 [18] 201 [38] 200–201 [6] 200 [28,32]				
1,2,3,4-Tetraphenylbutadiene-1,3 				
183–184 [21]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,5,5-Tetraphenylpentadiene-1,4				
76–77 [36]				
$C_{30}H_{26}$				
1,1,6,6,-Tetraphenylhexadiene-1,3				
196–197 [16]				
1,1,6,6-Tetraphenylhexadiene-1,5				
108–109 [3] 108 [8,24]				
1,3,4,6-Tetraphenylhexadiene-1,5				
137–138 [5]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,6,6-Tetraphenylhexadiene-2,4  148–149 [33]				
3,4-Di-*p*-biphenylylhexadiene-2,4  151 [12]				
1,5-Diphenyl-3-benzhydrylpentadiene-1,4  151–152 [28]				

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Diphenyl-1,4-di-*p*-tolylbutadiene-1,3				
207–210[15]				
1,2-Di-*p*-phenethenylphenylethane				
117–119[35]				
$C_{32}H_{30}$				
1,1,8,8-Tetraphenyloctadiene-1,7				
92–93[3,13,14,39]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,6,6-Tetraphenyl-2,5-dimethylhexadiene-1,5				
145–146[37]				
1,1,4,4-Tetra-*p*-tolylbutadiene-1,3				
255[10,11]				
$C_{33}H_{32}$				
1,1,9,9-Tetraphenylnonadiene-1,8				
	310 20[13,14]	1.047[14]		

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,10,10-Tetraphenyldecadiene-1,9 				
113[24] 107[13,14]				
$C_{42}H_{50}$				
1,1,18,18-Tetraphenyloctadecadiene-1,17 				
77[24]				

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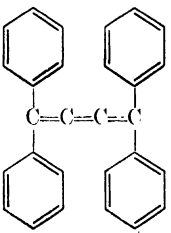
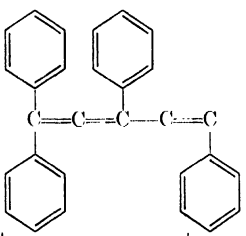
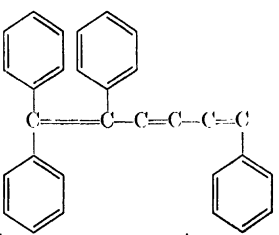
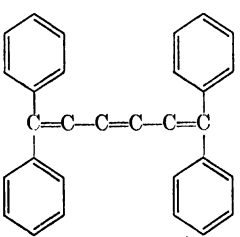
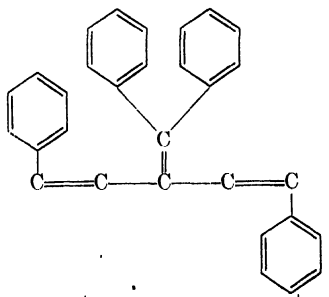
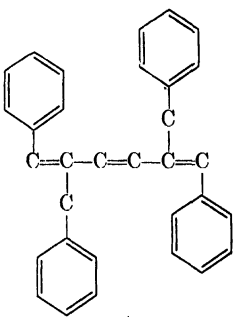
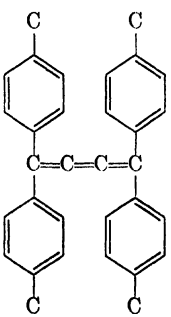
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Tetraphenylbutatriene 				
237				
240[1,2]				
237[9]				
236.5–237[8]				
235[16,17]				
$C_{29}H_{22}$				
1,1,3,5-Tetraphenylpentatriene-1,2,4 				
158[6]				
$C_{30}H_{24}$				
1,1,2,6-Tetraphenylhexatriene-1,3,5 				
158–160[12]				
1,1,6,6-Tetraphenylhexatriene-1,3,5 				
206–207[9]				
204–205[10,15]				
202–204[14]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,6,6-Tetraphenylhexatriene (a)				
172–174[5]				
(a) The position of the double bonds in not given.				
1,5-Diphenyl-3-benzhydrylidenepentadiene-1,4 				
173–174[11]				
$C_{32}H_{28}$				
1,6-Diphenyl-2,5-dibenzylhexatriene-1,3,5 				
184[13]				
Tetra-*p*-tolylbutatriene 				
242[4] 240[3,7]				

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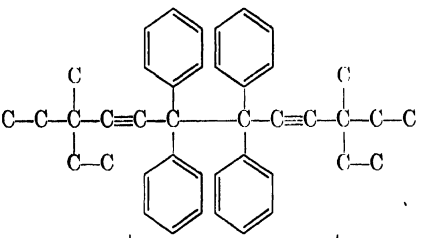
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2,11,11-Tetramethyl-6,6,7,7-tetraphenyldodecadiyne (a)				
116–118[2]				
(a) The triple bonds are in either the 3,9 or 4,8 positions.				
$C_{42}H_{46}$				
3,10-Dimethyl-3,10-diethyl-6,6,7,7-tetraphenyldodecadiyne-4,8 				
140–142[1]				

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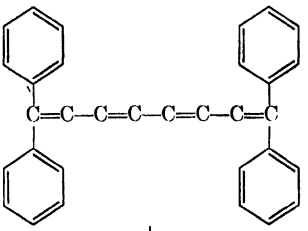
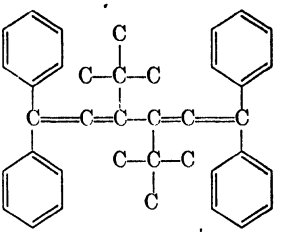
7. FOUR PHENYL SUBSTITUTIONS ON ALKATETRAENES, C_nH_{2n-18}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,8,8-Tetraphenyloctatetraene-1,3,5,7 				
200[2,4] 198–199[3]				
$C_{38}H_{38}$				
1,1,6,6-Tetraphenyl-3,4-di-*tert*-butylhexatetraene-1,2,4,5 				
152[1]				

References on Four Phenyl Substitutions on Alkatetraenes

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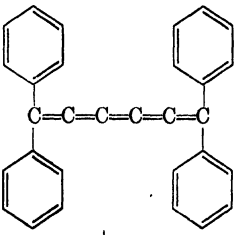
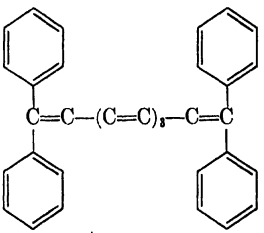
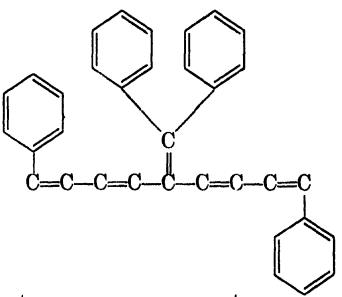
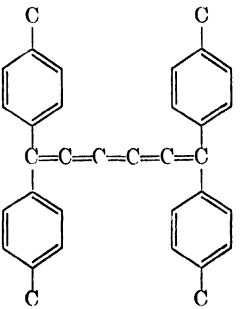
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Tetraphenylhexapentaene 				
302 [2]				
$C_{34}H_{28}$				
1,1,10,10-Tetraphenyldecapentaene-1,3,5,7,9 				
227–228 [6] 227 [3,7]				
1,9-Diphenyl-5-benzhydrylidenenonatetraene-1,3,6,8 				
150–151 [5] 149 [4]				

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,6,6-Tetra-*p*-tolylhexapentaene-1,2,3,4,5				
326[1]				

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1. Kuhn, R., and G. Platzer, Ber. **13**, 1410 1940.
2. Kuhn, R., and K. Wallenfels, Ber. **71**, 783 1938.
3. Müller, E., and I. Dammerau, Ber. **70**, 2561 1937.
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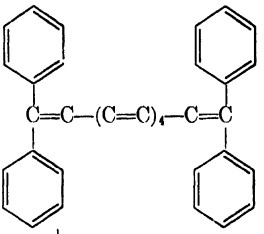
M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,12,12-Tetraphenyldodecahexaene-1,3,5,7,9,11 				
213–214.5[1,2]				

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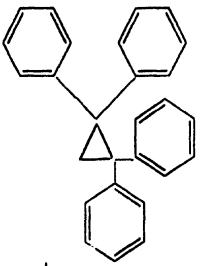
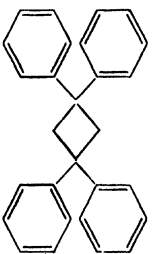
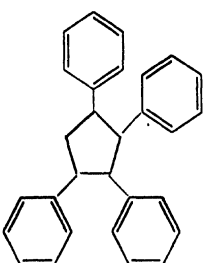
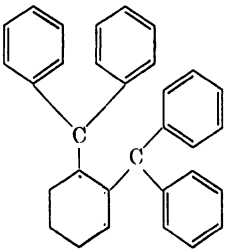
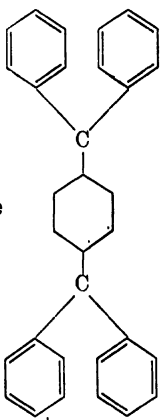
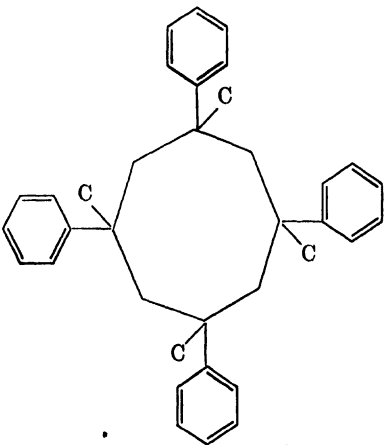
XIV. FOUR PHENYL SUBSTITUTIONS ON ALICYCLICS

1. Four Phenyl Substitutions on Cyclanes or Cyclylalkanes C_nH_{2n-32}
2. Four Phenyl and Two Cyclyl Substitutions on Alkanes C_nH_{2n-34}
3. Four Phenyl Substitutions on Cyclodienes or Cyclodiylidenes C_nH_{2n-36}
4. Four Phenyl Substitutions on Cyclotrienes, Cyclodienylidenes, or Dialkenylspiranes C_nH_{2n-38}
5. Four Phenyl Substitutions on Cyclotetraenes or Cyclodienyldiylidenes C_nH_{2n-40}
6. Four Phenyl Substitutions on Dicyclenes C_nH_{2n-40}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,2,2-Tetraphenylcyclopropane 				
165.5[8]				
$C_{28}H_{24}$ **1,1,3,3-Tetraphenylcyclobutane** 				
143.5[7] 143[4,5]				
$C_{29}H_{26}$ **1,2,3,4-Tetraphenylcyclopentane** 				
80.5–81[2,3]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
cis-1,2-Dibenzhydrylcyclohexane 				
174–175[10]				
trans-1,2-Dibenzhydrylcyclohexane				
212–213[1] 210–212[10]				
cis-1,4-Dibenzhydrylcyclohexane 				
224–225[9]				
trans-1,4-Dibenzhydrylcyclohexane				
248–250[9]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3,5,7-Tetramethyl-1,3,5,7-tetraphenylcyclooctane 				
127–129 [6]		1.0594 (amorphous) [6] 1.1452 (solid) [6]		

References on Four Phenyl Substitutions on Cyclanes or Cyclylalkanes

1. Bergmann, E., Ber. **63**, 2593 1930.
2. Carpenter, H., Ann. **302**, 223 1898.
3. Henderson, G. G., and R. H. Corstorphine, J. Chem. Soc. **79**, 1256 1901.
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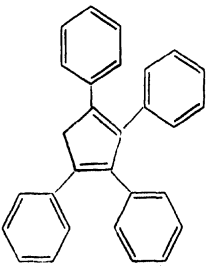
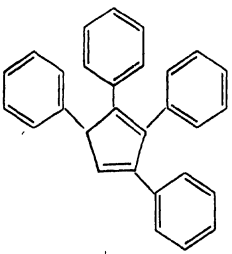
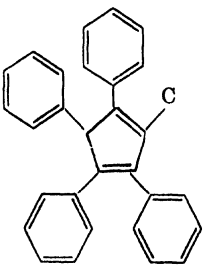
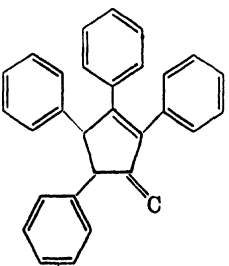
10. Wittig, G., and G. Waltnitzki, Ber. **67**, 667 1934.

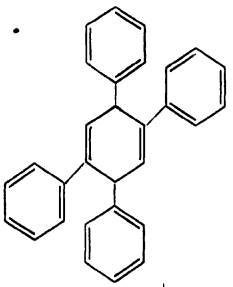
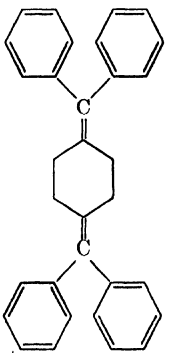
2. FOUR PHENYL AND TWO CYCLYL SUBSTITUTIONS ON ALKANES, C_nH_{2n-34}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Tetraphenyldicyclopentylethane (a)				
117–119 (in N_2)[1]				
87–89[1]				
(a) The structure of this compound is not given.				

References on Four Phenyl and Two Cyclyl Substitutions on Alkanes

1. Ziegler, K., A. Seib, F. Knövenagel, P. Herte, and F. Andreas, Ann. **551**, 150 1942; C.A. **37**, 5388 1943.

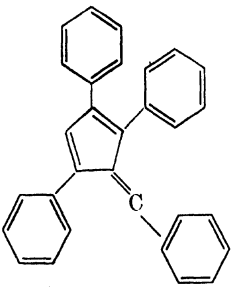
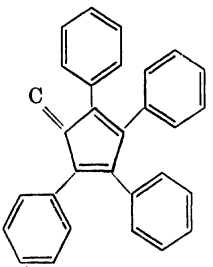
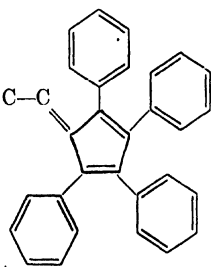
M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,3,4-Tetraphenylcyclopentadiene-1,3  178[4] 177[3]				
1,2,3,5-Tetraphenylcyclopentadiene-1,3  177–178[2]				
$C_{30}H_{24}$  1,3,4,5-Tetraphenyl-2-methylcyclopentadiene-1,3 or 1,2,4,5-Tetraphenyl-3-methylenecyclopentene-1 or  163[1]				

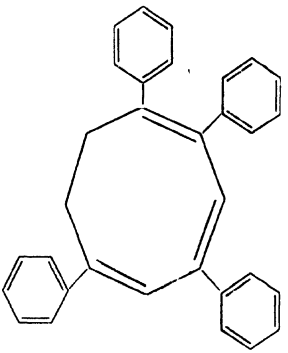
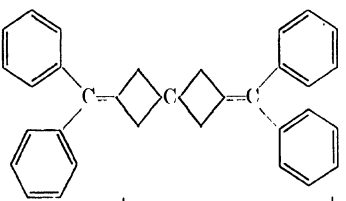
M. P., °C	B..P.,°C @ 760mm	D_4^{20} p	n_D^{20}	Additional Data
1,2,4,5-Tetraphenylcyclohexadiene-2,5 				
208–210[5]				
$C_{32}H_{28}$				
1,4-Dibenzhydrylidenecyclohexane 				
258–260[6]				

References on Four Phenyl Substitutions on Cyclodienes or Cyclodiylidenes

1. Allen, C. F. H , and J. A. Van Allan, J. Am. Chem. Soc. **65**, 1384 1943.
2. Auerbach, E. B., Ber. **36**, 933 1903.
3. Carpenter, H., Ann. **302**, 223 1898.
4. Dilthey, W., W. Braun, and O. Trösken, J. prakt. Chem. [2] **139**, 1 1933.
5. Schlenk, W., and E. Bergmann, Ann. **463**, 1 1928.
6. Wittig, G., and H. Pook, Ber. **70**, 2485 1937.

4. FOUR PHENYL SUBSTITUTIONS ON CYCLOTRIENES, CYCLODIENYLIDENES, OR DIALKENYLSPIRANES, C_nH_{2n-38}

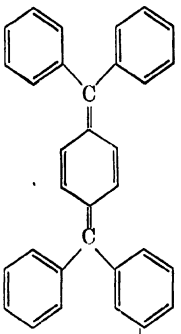
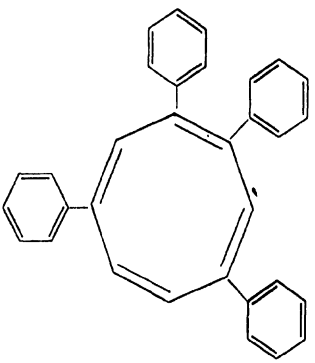
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,4-Triphenyl-3-benzylidenecyclopentadiene-1,4 				
156[4]				
1,2,3,4-Tetraphenyl-5-methylenecyclopentadiene-1,3 				
211[4]				
$C_{31}H_{24}$				
1,2,3,4-Tetraphenyl-5-ethylidenecyclopentadiene-1,3 				
194–195[4]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,4,6-Tetraphenylcyclooctatriene-1,3,5 (Dypnopinacolene-α) 				
95.5–96 [2] 95–96 [3]				
Dypnopinacolene-γ (a)				
81–82 [3]				
(a) The structure of this compound is not given.				
$C_{33}H_{28}$				
2,6-Dibenzhydrylidenespiro-[3,3]-heptane 				
116–116.5 [1]				

References on Four Phenyl Substitutions on Cyclotrienes, Cyclodienylidenes or Dialkenylspiranes

1. Backer, H. J , and H. G. Kemper, Rec. trav. chim. **57**, 1249 1938.
2. Delacre, M., Bull. classe sci. Acad. roy. Belg. [3] **22**, 470 1891.
3. Delacre, M., Bull. classe sci. Acad. roy. Belg. [3] **27**, 36 1894.
4. Dilthey, W., and P. Huchtemann, J. prakt. Chem. [2] **154**, 238 1940.

5. FOUR PHENYL SUBSTITUTIONS ON CYCLOTETRAENES OR CYCLODIENYLDIYLIDENES, C_nH_{2n-40}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Dibenzhydrylidenecyclohexadiene-2,5 				
286 (in CO_2)[1] 239–242[6] 240[1] 238–240[5]				
1,2,4,7-Tetraphenyloctatetraene-1,3,5,7 				
200–200.5[2] 200[3]				
Isodypnopinacolene-α (a)				
175.5[7]				
(a) The structure of this compound is not given.				
Isodypnopinacolene-β (a)				
172[3] 171[7]				
(a) The structure of this compound is not given.				

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Benzhydrylidene-4-(phenyl-*p*-tolylmethylene)-cyclohexadiene-2,5				
197 (in CO_2)[1]				
1,4-Dibenzhydrylidene-2-methylcyclohexadiene-2,5				
200–210[5]				
$C_{34}H_{28}$ 1,4-Dibenzhydrylidene-2,5-dimethylcyclohexadiene-2,5				
200[4,6]				

References on Four Phenyl Substitutions on Cyclotetraenes or Cyclodienyldiylidenes

1. Chichibabin, A. E., Ber. **41**, 2770 1908.
2. Delacre, M., Bull. classe sci. Acad. roy. Belg. [3] **22**, 470 1891.
3. Delacre, M., Bull. classe sci. Acad. roy. Belg [3] **29**, 849 1895.
4. Staudinger, H., Ber. **41**, 1355 1908.
5. Staudinger, H., and S. Bereza, Ann. **380**, 243 1911.
6. Thiele, J., and H. Balhorn, Ber. **37**, 1463 1904.
7. Terlinck, E., Bull. classe sci. Acad. roy. Belg. **1904**, 1049

6. FOUR PHENYL SUBSTITUTIONS ON DICYCLENES, C_nH_{2n-40}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Tetrabenzyldicyclopentene (a)				
88[1]				
(a) The structure of this compound is not given.				

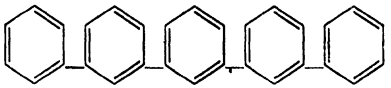
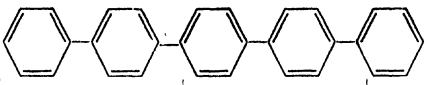
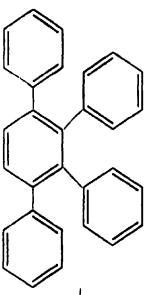
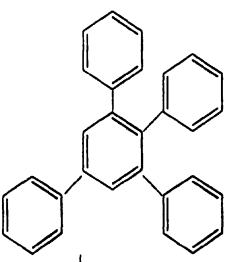
References on Four Phenyl Substitutions on Dicyclenes

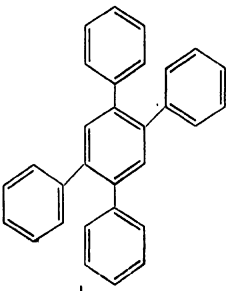
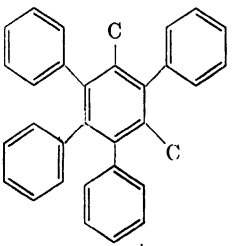
1. Alder, K., and H. Holzrichter, Ann. **524**, 145 1936.

XV. QUINQUAPHENYLS AND THEIR ALIPHATIC DERIVATIVES

1. Quinquaphenyls and Their Alkyl Derivatives C_nH_{2n-38}

1. QUINQUAPHENYLS AND THEIR ALKYL DERIVATIVES, C_nH_{2n-38}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
m-Quinquaphenyl 				
112[1]				
p-Quinquaphenyl 				
395[1] 388–389[6] 388.5[4,5]				
Pentaphenyl (a)				
445(b)[9] 401(c)[9]				
(a) The structure of this compound is not given. (b) The solid becomes a crystalline liquid at this temperature. (c) The solid becomes an amorphous liquid at this temperature.				
1,2,3,4-Tetraphenylbenzene 				
193–194[2] 190–191[3]				
1,2,3,5-Tetraphenylbenzene 				
277–278[10]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,4,5-Tetraphenylbenzene 				Sublimation Temp., °C 264[7]
269–270[3]				
$C_{32}H_{26}$				
1,3-Dimethyl-2,4,5,6-tetraphenylbenzene 				
110–111[8]				

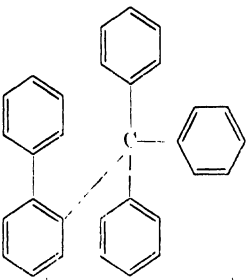
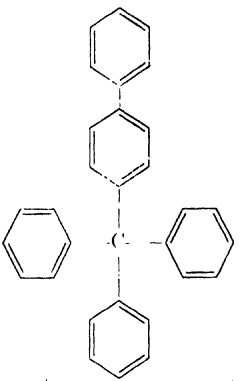
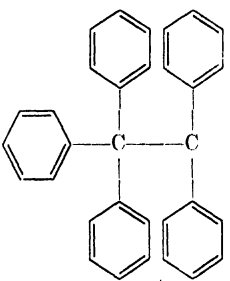
References on Quinquaphenyls and Their Alkyl Derivatives

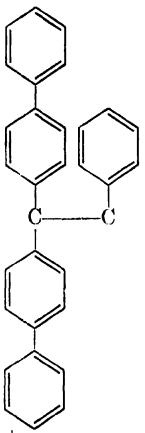
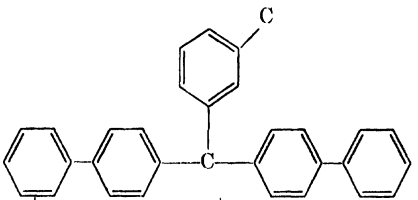
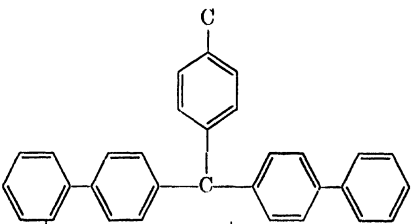
1. Busch, M., and W. Weber, J. prakt. Chem. [2] **146**, 1 1936.
2. Dilthey, W., and G. Hurtig, Ber. **67**, 495 1934.
3. Dilthey, W., and G. Hurtig, Ber. **67**, 2004 1934.
4. Gerngross, O., and M. Dunkel, Ber. **57**, 739 1924.
5. Gerngross, O., C Shakhnov, and R. Jones, Ber. **57**, 747 1924.
6. Müller, E., and T. Töpel, Ber. **72**, 273 1939.
7. Schönberg, A., and A. F. A. Ismail, J. Chem. Soc. **1942**, 585.
8. Stark, O., and L. Klebahn, Ber. **47**, 125 1914.
9. Vorländer, D., Z. physik. Chem. **126**, 449 1927.
10. Wislicenus, J., and A. Lehmann, Ann. **302**, 195 1898.

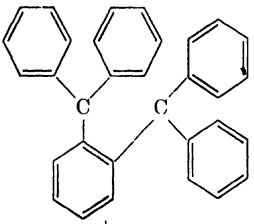
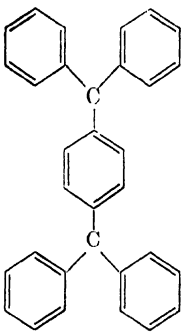
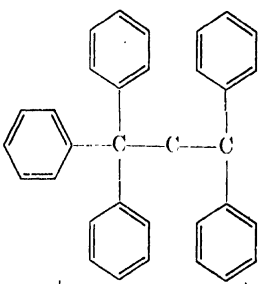
XVI. FIVE PHENYL, THREE PHENYL AND ONE BIPHENYLYL, OR ONE PHENYL AND TWO BIPHENYLYL SUBSTITUTIONS ON ALIPHATICS

1. Five Phenyl, Three Phenyl and One Biphenylyl, or One Phenyl and Two Biphenylyl Substitutions on Alkanes C_nH_{2n-38}
2. Five Phenyl, Three Phenyl and One Biphenylyl, or One Phenyl and Two Biphenylyl Substitutions on Alkenes C_nH_{2n-40}
3. Five Phenyl Substitutions on Alkadienes C_nH_{2n-42}
4. Five Phenyl Substitutions on Alkatrienes C_nH_{2n-44}

1. FIVE PHENYL, THREE PHENYL AND ONE BIPHENYLYL, OR ONE PHENYL AND TWO BIPHENYLYL SUBSTITUTIONS ON ALKANES, C_nH_{2n-38}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Triphenyl-*o*-biphenylylmethane  171[14]				
Triphenyl-*p*-biphenylylmethane  197–198[11]				
Phenyldibiphenylylmethane (a) 161[9]				
(a) The structure of this compound is not given.				
$C_{32}H_{26}$ **Pentaphenylethane**  182–185 (in N_2)[1] 182–183 (in N_2)[4] 179[7]		1.166 0°[18]		

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Pentaphenylethane (*Continued*)				
178–179[5]				
178–179 (in CO_2)[6]				
176[10]				
166-178[1]				
160–170[6]				
1,1-Di-*p*-biphenylyl-2-phenylethane 				
195–196[12]				
***m*-Tolyldi-*p*-biphenylylmethane** 				
144–145[3]				
***p*-Tolyldi-*p*-biphenylylmethane** 				
162–163[3]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Dibenzhydrylbenzene 				
146.5[17]				
1,4-Dibenzhydrylbenzene 				
172[13,16] 170–171[15]				
$C_{33}H_{28}$				
1,1,1,3,3-Pentaphenylpropane 				
158–159[8]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,1,2-Tetraphenyl-2-*m*-tolylethane				
157–159 (in N_2)[2] 149–157[2]				
1,1,1,2-Tetraphenyl-2-*p*-tolylethane				
183–185 (in N_2)[1] 176–181[1]				
$C_{34}H_{30}$				
1,1,1-Triphenyl-2,2-di-*p*-tolylethane				
170–180 (in N_2)[1] 163–172[1]				

References on Five Phenyl, Three Phenyl and One Biphenylyl, or One Phenyl and Two Biphenylyl Substitutions on Alkanes

1. Bachmann, W. E., J. Am. Chem. Soc. **55**, 2135 1939.
2. Bachmann, W. E., R. Hoffman, and F. Whitehead. J. Org. Chem. **8**, 320 1943.
3. Bachmann, W. E., and F. H. Moser, J. Am. Chem. Soc. **54**, 1124 1932.
4. Bachmann, W. E., and F. Y. Wiselogle, J. Org. Chem. **1**, 354 1936-1937.
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8. Koelsch, C. F., and R. H. Rosenwald, J. Am. Chem. Soc. **59**, 2170 1937.
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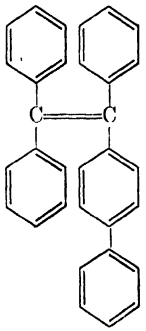
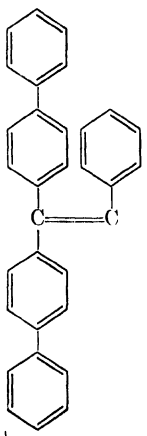
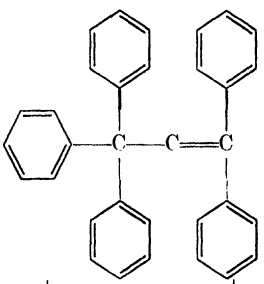
13. Ullmann, F., and C. Schläpfer, Ber. **37**, 2001 1904.
14. Wieland, H., K. Heymann, T. Tsatsas, D. Juchum, G. Varvoglis, G. Labriola, O. Dobbelstein, and H. S. Boyd-Barrett, Ann. **514**, 145 1934.
15. Wittig, G., and A. Klein, Ber. **69**, 2087 1936.
16. Wittig, G., and H. Kröhne, Ann. **529**, 142 1937.
17. Wittig, G., and M. Leo, Ber. **64**, 2395 1931.
18. Ziegler, K., and F. Ditzel, Ann. **473**, 194 1929.

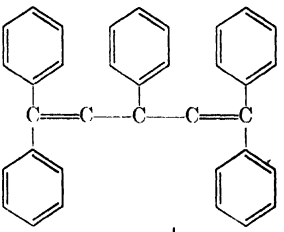
2. FIVE PHENYL, THREE PHENYL AND ONE BIPHENYLYL, OR ONE PHENYL AND TWO BIPHENYLYL SUBSTITUTIONS ON ALKENES, C_nH_{2n-40}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,2-Triphenyl-2-*p*-biphenylylethene 189–190 [2]				
1,1-Di-*p*-biphenylyl-2-phenylethene 195–196 [4] 192–193 [3]				
$C_{33}H_{26}$ 1,1,1,3,3-Pentaphenylpropene-2 132–133 [1]				

References on Five Phenyl, Three Phenyl and One Biphenylyl, or One Phenyl and Two Biphenylyl Substitutions on Alkenes

1. Koelsch, C. F., and R. H. Rosenwald, J. Am. Chem. Soc. **59**, 2170 **1937**.
2. Norris, J. F., R. Thomas, and B. M. Brown, Ber. **43**, 2940 **1910**.
3. Pfeiffer, P., and P. Schneider, J. prakt. Chem. [2] **129**, 129 **1931**,
4. Shilov, E. A., J. Russ. Phys. Chem. Soc. **62**, 95 **1930**; Chem. Zentr. **1930**, II, 2524.

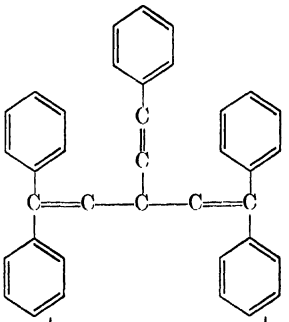
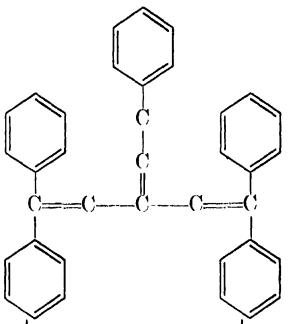
3. FIVE PHENYL SUBSTITUTIONS ON ALKADIENES, C_nH_{2n-42}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,3,5,5-Pentaphenylpentadiene-1,4 				
168–169[1]				

References on Five Phenyl Substitutions on Alkadienes

1. Wittig, G., and H. Kosak, Ann. **529**, 167 1937.

4. FIVE PHENYL SUBSTITUTIONS ON ALKATRIENES, C_nH_{2n-44}

	M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,5,5-Tetraphenyl-3-phenethenylpentadiene-1,4 	141–142[1]				
1,1,5,5-Tetraphenyl-3-phenethylidenepentadiene-1,4 	130–131[1]				

References on Five Phenyl Substitutions on Alkatrienes

1. Wittig, G., and H. Kosack, Ann. 529, 167 1937.

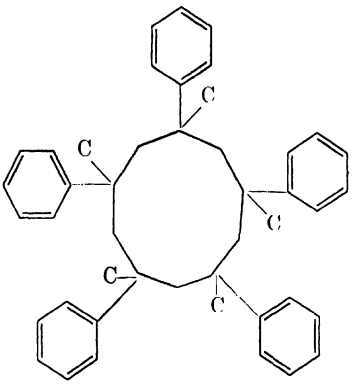
XVII. FIVE PHENYL SUBSTITUTIONS ON ALICYCLICS

1. Five Phenyl Substitutions on Cyclanes C_nH_{2n-40}
2. Five Phenyl Substitutions on Cyclodienes C_nH_{2n-44}
3. Five Phenyl Substitutions on Cyclodienylidenes C_nH_{2n-46}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Pentaphenylcyclopentane (a)				
145[1,3]				
(a) The structure of this compound is not given.				

$C_{45}H_{50}$

1,3,5,7,9-Pentaphenyl-1,3,5,7,9-pentamethylcyclodecane

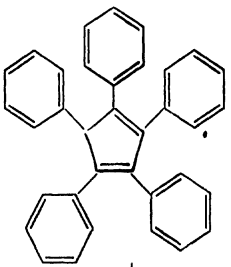
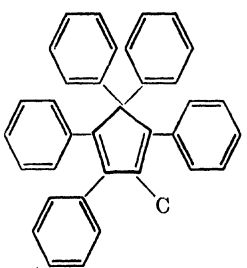


240–244 0.1[2]	1.0624[2]	1.5960[2]	

References on Five Phenyl Substitutions on Cyclanes

1. Newmann, F. H., Ann. 302, 236 1898.
2. Staudinger, H., and F. Breusch, Ber. 62, 442 1929.
3. Wislicenus, J., and F. H. Newmann, Ann. 302, 236 1898.

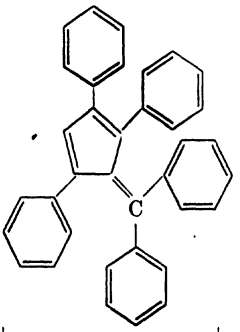
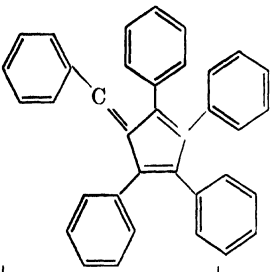
2. FIVE PHENYL SUBSTITUTIONS ON CYCLODIENES, C_nH_{2n-44}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,3,4,5-Pentaphenylcyclopentadiene-1,3 				
252–254[2] 250[1,4]		1.206 0°[3]		
$C_{36}H_{28}$  **1,1,2,4,5-Pentaphenyl-3-methylcyclopentadiene-2,4**				
159[1]				

References on Five Phenyl Substitutions on Cyclodienes

1. Allen, C. F. H., and J. A. Van Allan, J. Am. Chem. Soc. **65**, 1384 1943.
2. Koelsch, C. F., and T. A. Geissman, J. Org. Chem. **3**, 480 1938.
3. Ziegler, K., and F. Ditzel, Ann. **473**, 194 1929.
4. Ziegler, K., and B. Schnell, Ann. **445**, 266 1925.

3. FIVE PHENYL SUBSTITUTIONS ON CYCLODIENYLIDENES, C_nH_{2n-46}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,4-Triphenyl-3-benzhydrylidenecyclopentadiene-1,4 				
181[1]				
1,2,3,4-Tetraphenyl-5-benzylidenecyclopentadiene-1,3 				
204[2] 200–201[1]				

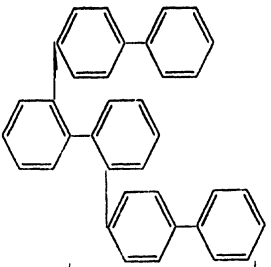
References on Five Phenyl Substitutions on Cyclodienylidenes.

1. Dilthey, W., and P. Huchtemann, J. prakt. Chem. [2] 154, 238 1940.
2. Löwenbein, A., and G. Ulich, Ber. 58, 2662 1925.

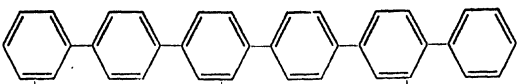
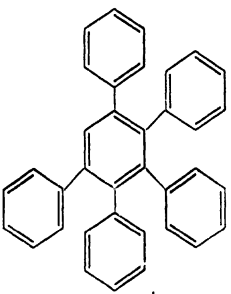
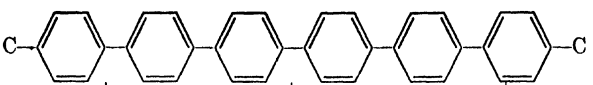
XVIII. SEXAPHENYLS AND THEIR ALIPHATIC DERIVATIVES

1. Sexaphenyls and Their Alkyl Derivatives C_nH_{2n-46}

1. SEXAPHENYLS AND THEIR ALKYL DERIVATIVES, C_nH_{2n-46}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2′-Dibiphenylylbiphenyl (a) 				
185[1]				

(a) The name given to this compound by the author was 2,2″-Diphenylyldiphenyl, which is probably the above compound.

***p*-Sexaphenyl** 				
475[3,7,9] 465[8,10]				
Pentaphenylbenzene 				
252–253[5] 251[6] 246[2]				
$C_{38}H_{30}$ ***p*-Ditolyl-*p*-quatraphenyl** 				
469 (in CO_2) [10] 162–163[4]				

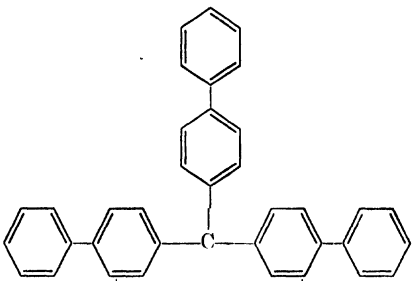
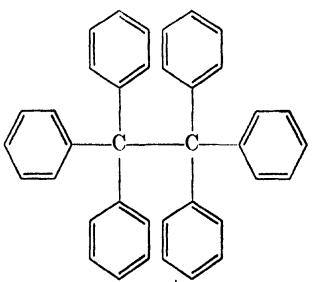
References on Sexaphenyls and Their Alkyl Derivatives.

1. Adam, T. C. C., and A. Russell, J. Chem. Soc. **1930**, 202.
2. Allen, C. F. H., and A. Bell, J. Am. Chem. Soc. **61**, 521 **1939**.
3. Busch, M., and W. Weber, J. prakt. Chem. [2] **146**, 1 **1936**.
4. Chichibabin, A. E., J. Russ. Phys. Chem. Soc. **39**, 925 **1907**; C.A. **2**, 405 **1908**.
5. Dilthey, W., and G. Hurtig, Ber. **67**, 495 **1934**.
6. Dilthey, W., and G. Hurtig, Ber. **67**, 2004 **1934**.
7. Kuhn, R., Ann. **475**, 131 **1929**.
8. Pummerer, R., Ber. **66**, 802 **1933**.
9. Pummerer, R., and K. Bittner, Ber. **57**, 84 **1924**.
10. Pummerer, R., and L. Seligsberger, Ber. **64**, 2477 **1931**.

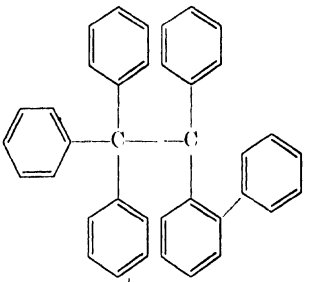
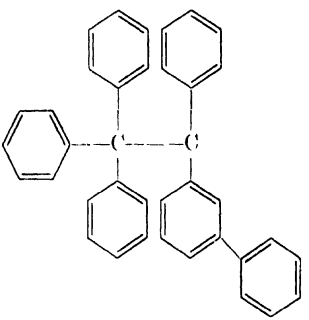
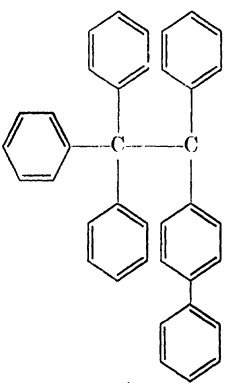
XIX. SIX PHENYL, FOUR PHENYL AND ONE BIPHENYLYL, TWO PHENYL AND TWO BIPHENYLYL, OR THREE BIPHENYLYL SUBSTITUTIONS ON ALIPHATICS

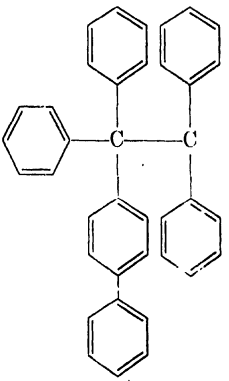
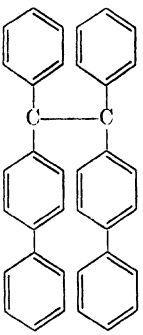
1. Six Phenyl, Four Phenyl and One Biphenylyl, Two Phenyl and Two Biphenylyl, or Three Biphenylyl Substitutions on Alkanes C_nH_{2n-46}
2. Six phenyl or Two Phenyl and Two Biphenylyl Substitutions on Alkenes C_nH_{2n-48}
3. Six Phenyl Substitutions on Alkynes C_nH_{2n-50}
4. Six Phenyl Substitutions on Alkadienes C_nH_{2n-50}
5. Six Phenyl Substitutions on Alkatrienes C_nH_{2n-52}
6. Six Phenyl Substitutions on Alkadiynes C_nH_{2n-54}
7. Six Phenyl Substitutions on Alkahexaenes C_nH_{2n-58}

1. SIX PHENYL, FOUR PHENYL AND ONE BIPHENYLYL, TWO PHENYL AND TWO BIPHENYLYL, OR THREE BIPHENYLYL SUBSTITUTIONS ON ALKANES, C_nH_{2n-46}

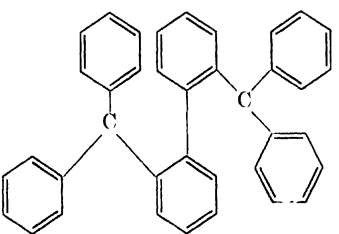
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_{20}^{20}	Additional Data
Tri-*p*-biphenylylmethane 				
237				
241–242 [23]				
235–237 [16]				
235–236 [25]				
231 [29]				
$C_{38}H_{30}$				
Hexaphenylethane 				
227				
227–230 [6]		1.141	0°(a) [33]	
227 [24]		1.168	0°(b) [33]	
226–227 [14]				
225 [1,15]				

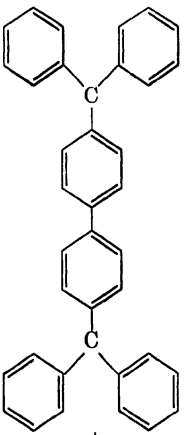
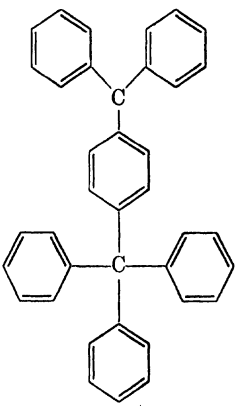
(a) This density is an average of three determinations on the compound precipitated from acetone.
(b) This density is an average of three determinations on the compound precipitated from formic ester.

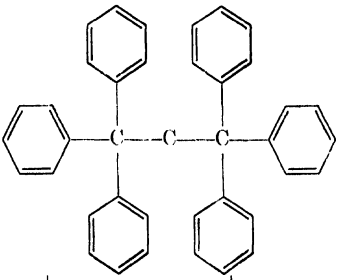
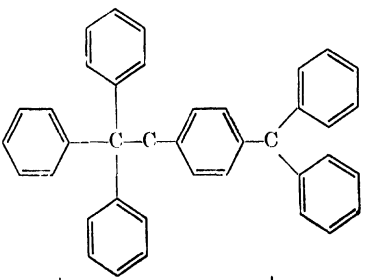
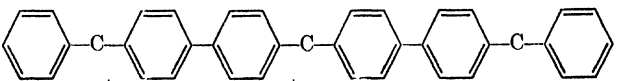
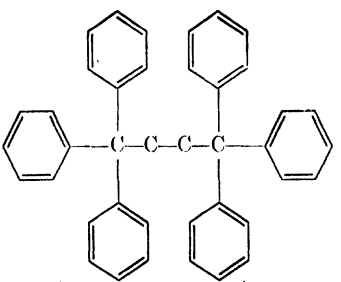
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,1,2-Tetraphenyl-2-*o*-biphenylylethane 				
175–178 (in N_2) [3] 167–173 [3]				
1,1,1,2-Tetraphenyl-2-*m*-biphenylylethane 				
168–169 (in N_2) [3] 146–153 [3]				
1,1,1,2-Tetraphenyl-2-*p*-biphenylylethane 				
166–175 (in N_2) [2] 161–171 [2]				

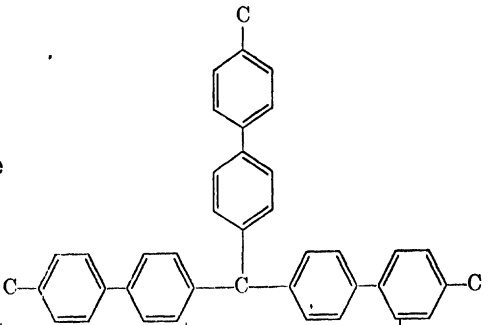
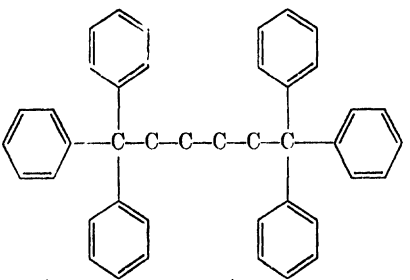
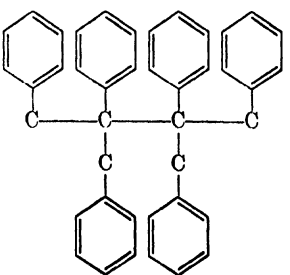
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,2,2-Tetraphenyl-1-*p*-biphenylylethane 				
190–192 (in N_2)[4]				
1,2-Diphenyl-1,2-di-*p*-biphenylylethane 				
247[18] 245–246[5] 205–206(a)[18] 202–203(b)[5]				

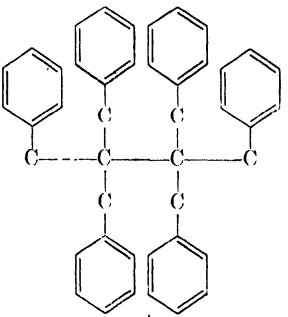
(a) This melting point was determined on the *meso*-racemic isomer of the compound melting at 247.
(b) This melting point was determined on an isomer of the compound melting at 245-246.

2,2′-Dibenzhydrylbiphenyl 				
238.5–239[32] 236–237.5[11]				

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4,4′-Dibenzhydrylbiphenyl 				
162–163 [8]				
(4-Benzhydrylphenyl)-triphenylmethane 				
229				
232 [22]				
231 [27]				
230 [13]				
228 [28]				
227 [9,10]				
226–227 [21]				
225 [31]				
223–224 [17]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,1,3,3,3-Hexaphenylpropane 				
216[19]				
1,1,1-Triphenyl-2-(4′-benzhydrylphenyl)-ethane 				
177[30]				
Di-(4-benzyl-*p*-biphenylyl)-methane 				
179–180[7]				
$C_{40}H_{34}$				
1,1,1,4,4,4-Hexaphenylbutane 				
271[29]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Tri-(4-methyl-*p*-biphenylyl)-methane 				
174.0–174.5[16]				
$C_{42}H_{38}$				
1,1,1,6,6,6,-Hexaphenylhexane 				
189[12]				
1,2,3,4-Tetraphenyl-2,3-dibenzylbutane 				
126–127[24]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Diphenyl-2,2,3,3-tetrabenzylbutane 				
82–83 [26] 80–81 [20]				

References on Six Phenyl, Four Phenyl and One Biphenylyl, Two Phenyl and Two Biphenylyl, or Three Biphenylyl Substitutions on Alkanes

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28. Vansheidt and Moldavskiĭ, Ber. **63**, 1362 **1930**.
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30. Wieland, H., and H. Kloss, Ann. **470**, 201 1929.
31. Wieland, H., and C. Müller, Ann. **401**, 233 1913.
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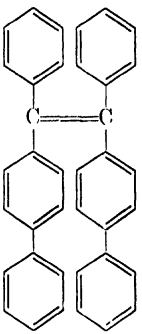
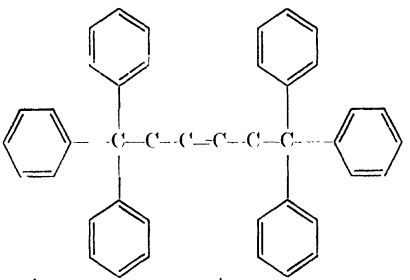
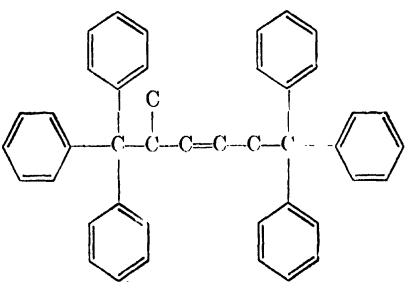
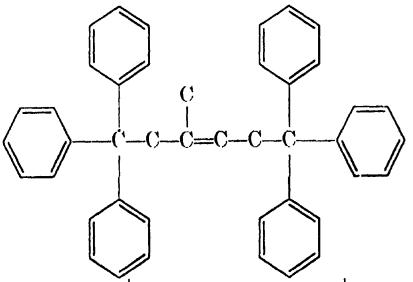
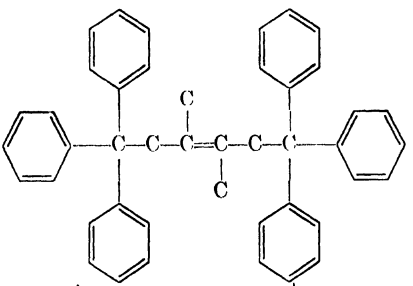
2. SIX PHENYL OR TWO PHENYL AND TWO BIPHENYLYL SUBSTITUTIONS ON ALKENES, C_nH_{2n-48}

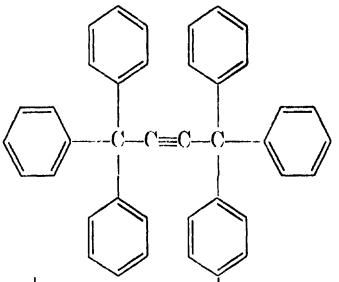
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Diphenyl-1,2-di-*p*-biphenylylethene 				
255[3] 218(a)[3]				
(a) This constant was determined on the *cis-trans* isomer.				
$C_{42}H_{36}$				
1,1,1,6,6,6-Hexaphenylhexene-3 				
224[1]				
$C_{43}H_{38}$				
1,1,1,6,6,6-Hexaphenyl-2-methylhexene-3 				
174[1]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,1,6,6,6-Hexaphenyl-3-methylhexene-3 				
166[2]				
$C_{44}H_{40}$				
1,1,1,6,6,6-Hexaphenyl-3,4-dimethylhexene-3 				
240[2]				

References on Six Phenyl or Two Phenyl and Two Biphenylyl Substitutions on Alkenes

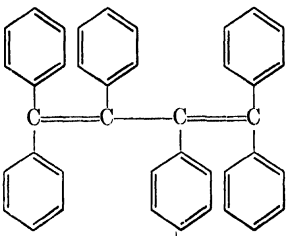
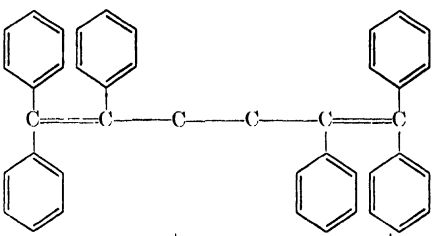
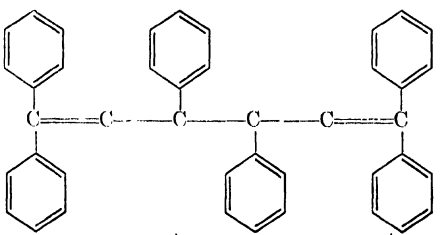
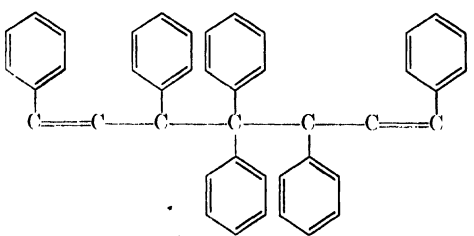
1. Conant, J. B., and B. F. Chow, J. Am. Chem. Soc. **55**, 3475 1933.
2. Conant, J. B., and H. W. Scherp, J. Am. Chem. Soc. **53**, 1941 1931.
3. Schlenk, W., and E. Bergmann, Ann. **463**, 1 1928.

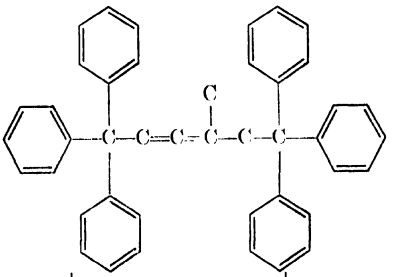
3. SIX PHENYL SUBSTITUTIONS ON ALKYNES, C_nH_{2n-50}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,1,4,4,4-Hexaphenylbutyne-2 				
260[1]				

References on Six Phenyl Substitutions on Alkynes

1. Wieland, H., and H. Kloss, Ann. **470**, 201 1929.

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,2,3,4,4-Hexaphenylbutadiene-1,3 				
213–214[4]				
$C_{42}H_{34}$				
1,1,2,5,6,6-Hexaphenylhexadiene-1,5 				
222[2]				
1,1,3,4,6,6-Hexaphenylhexadiene-1,5 				
212–213[3] 211–212[7] 210–211[5]				
$C_{43}H_{36}$				
1,3,4,4,5,7-Hexaphenylheptadiene-1,6 				
145[1]				

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,1,6,6,6-Hexaphenyl-4-methylhexadiene-2,3 				
184–185.5[6]				

References on Six Phenyl Substitutions on Alkadienes

1. Bergmann, E., and T. Ukai, Ber. **66**, 54 **1933**.
2. Bergmann, E., and H. Weiss, Ber. **64**, 1485 **1931**.
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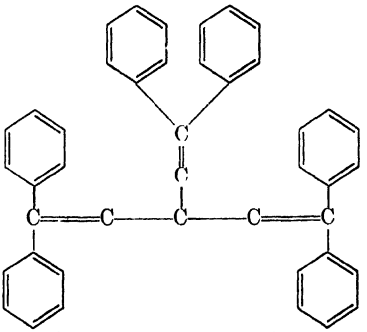
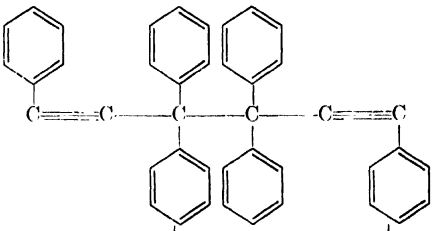
7. Wittig, G., and H. Kosak, Ann. **529**, 167 **1937**.

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,5,5-Tetraphenyl-3-(di-2′,2′-phenylethenyl)-pentadiene-1,4 				
223–224[1]				

References on Six Phenyl Substitutions on Alkatrienes

1. Wittig, G., and H. Kosack, Ann. 529, 167 1937.

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3,3,4,4,6-Hexaphenylhexadiyne-1,5 				
179[1]				
174–175[3]				
169[2]				

References on Six Phenyl Substitutions on Alkadiynes

1. Dufraisse, C., and A. Willemart, Bull. soc. chim. [5] **1**, 576 **1934**.
2. Munro, H. E., and C. S. Marvel, J. Am. Chem. Soc. **54**, 4445 **1932**.
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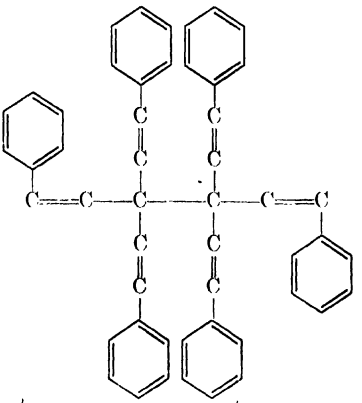
7. SIX PHENYL SUBSTITUTIONS ON ALKAHEXAENES, C_nH_{2n-58}

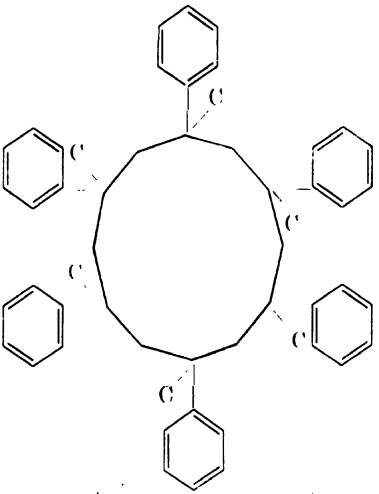
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,6-Diphenyl-3,3,4,4-tetraphenethenylhexadiene-1,5 				
173–174[1]				

References on Six Phenyl Substitutions on Alkahexaenes

1. Marvel, C. S., M. B. Mueller, and W. Peppel, J. Am. Chem. Soc. 60, 410 1938.

XX. SIX PHENYL SUBSTITUTIONS ON ALICYCLICS

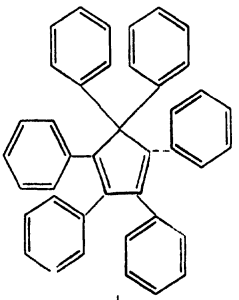
1. Six Phenyl Substitutions on Cyclanes C_nH_{2n-48}
2. Six Phenyl Substitutions on Cyclodienes C_nH_{2n-52}
3. Six Phenyl Substitutions on Cyclodienylidenes C_nH_{2n-54}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3,5,7,9,11-Hexaphenyl-1,3,5,7,9,11-hexamethylcyclododecane 	275–285 0.1[1]	1.0657[1]	1.6050[1]	

References on Six Phenyl Substitutions on Cyclanes

1. Staudinger, H., and F. Breusch, Ber. 62, 442 1929.

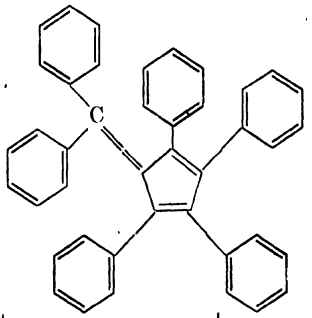
2. SIX PHENYL SUBSTITUTIONS ON CYCLODIENES, C_nH_{2n-52}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,2,3,4,5-Hexaphenylcyclopentadiene-2,4 				
172[1]				

References on Six Phenyl Substitutions on Cyclodienes

1. Allen, C. F. H., and J. A. Van Allan, J. Am. Chem. Soc. **65**, 1384 1943.

3. SIX PHENYL SUBSTITUTIONS ON CYCLODIENYLIDENES, C_nH_{2n-54}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,3,4-Tetraphenyl-5-benzhdrylidene-cyclopentadiene-1,3 				
301-302[1]				

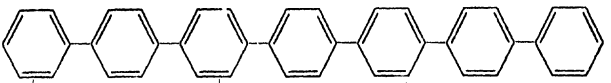
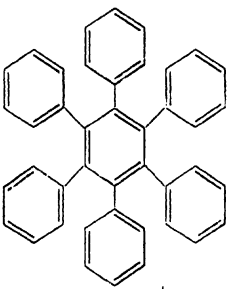
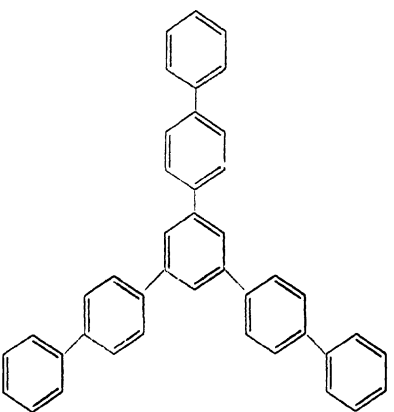
References on Six Phenyl Substitutions on Cyclodienylidenes

1. Dilthey, W., and P. Huchtemann, J. prakt. Chem. [2] **154**, 238 1940.

XXI. COMPOUNDS CONTAINING SEVEN PHENYL GROUPS

1. Septaphenyls C_nH_{2n-54}
2. Seven Phenyl or Three Phenyl and Two Biphenylyl Substitutions on Alkanes C_nH_{2n-54}
3. One Phenylalkynyl Substitution on Sexaphenyl C_nH_{2n-58}
4. Seven Phenyl Substitutions on Cyclanes C_nH_{2n-56}

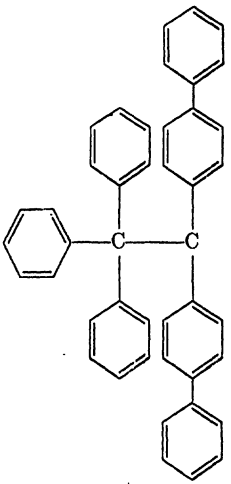
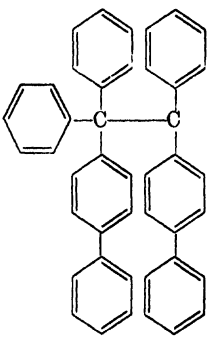
1. SEPTAPHENYLS, C_nH_{2n-54}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
p-Septaphenyl 				
545 [2]				
Hexaphenylbenzene 				
449–450 [4] 426 [5]				
1,3,5-Tri-*p*-biphenylylbenzene 				
232 [6] 230.5–231 [3] 230–231 [1]	400 12 [1]			

References on Septaphenyls

1. Bernhauer, K., P. Müller, and F. Neiser, J. prakt. Chem. [2] **145**, 301 1936.
2. Busch, M., and W. Weber, J. prakt. Chem. [2] **146**, 1 1936.
3. Clapp, D. B., and A. A. Morton, J. Am. Chem. Soc. **58**, 2172 1936.
4. Dilthey, W., and G. Hurtig, Ber. **67**, 495 1934.
5. Dilthey, W., and G. Hurtig, Ber. **67**, 2004 1934.
6. Skrowaczewska, Z., and E. Sucharda, Roczniki Chem. **16**, 151 1936; C.A. **31**, 2196 1937.

2. SEVEN PHENYL OR THREE PHENYL AND TWO BIPHENYLYL SUBSTITUTIONS ON ALKANES, C_nH_{2n-54}

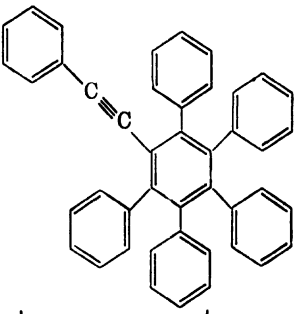
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,1-Triphenyl-2,2-di-*p*-biphenylylethane 				
180–190 (in N_2)[1] 171–180[1]				
1,1,2-Triphenyl-1,2-di-*p*-biphenylylethane 				
180–185 (in N_2)[2]				
$C_{50}H_{46}$ **Di-(tribenzylmethyl)-benzene** (a)				
72–73[3]				

(a) The structure of this compound is not given.

References on Seven Phenyl or Three Phenyl and Two Biphenylyl Substitutions on Alkanes

1. Bachmann, W. E., J. Am. Chem. Soc. **55**, 2135 1939.
2. Bachmann, W. E., and F. Y. Wiselogle, J. Org. Chem. **1**, 354 1936-1937.
3. Kothe, R., Ann. **248**, 56 1888.

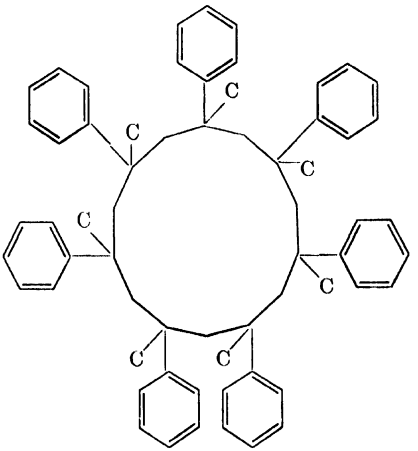
3. ONE PHENYLALKYNYL SUBSTITUTION ON SEXAPHENYL, C_nH_{2n-58}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Pentaphenylphenethynylbenzene 				
258[1]				

References on One Phenylalkynyl Substitution on Sexaphenyl

1. Dilthey, W., W. Schommer, W. Höschen, and H. Dietrichs, Ber. 68, 1159 1935.

4. SEVEN PHENYL SUBSTITUTIONS ON CYCLANES, C_nH_{2n-56}

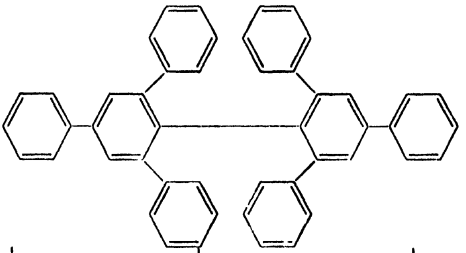
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3,5,7,9,11,13-Heptaphenyl-1,3,5,7,9,11,13-heptamethylcyclotetradecane 				
	312–316 0.1[1]	1.0671[1]	1.6010[1]	

References on Seven Phenyl Substitutions on Cyclanes

1. Staudinger, H., and F. Breusch, Ber. **62**, 442 1929.

XXII. COMPOUNDS CONTAINING EIGHT PHENYL GROUPS AND ALIPHATIC GROUPS

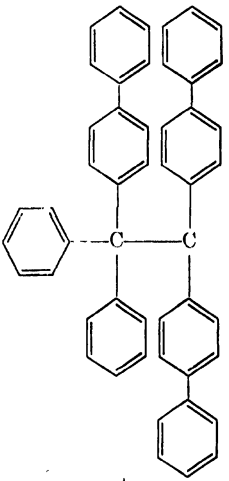
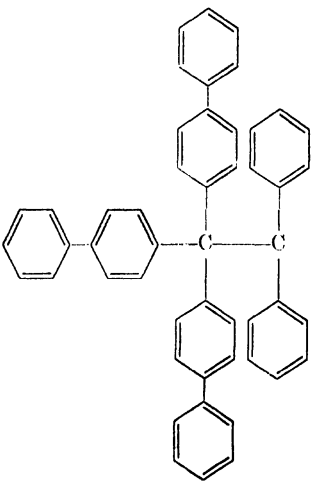
1. Octaphenyl C_nH_{2n-62}
2. Eight Phenyl, Two Phenyl and Three Biphenylyl, or Four Biphenylyl Substitutions on Alkanes C_nH_{2n-62}
3. Four Biphenylyl Substitutions on Alkenes C_nH_{2n-64}
4. Eight Phenyl Substitutions on Alkadienes C_nH_{2n-66}

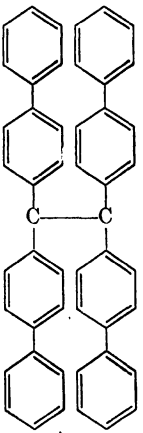
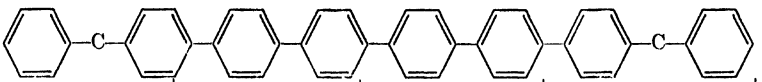
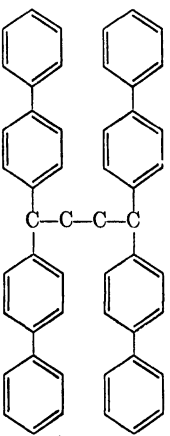
M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2′,4,4′,6,6′-Hexaphenylbiphenyl 				
348[1]				

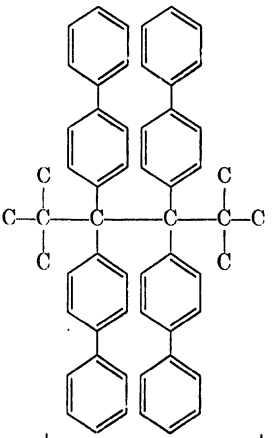
References on Octaphenyl

1. Kohler, E. P., and L. W. Blanchard, J. Am. Chem. Soc. **57**, 367 1935.

2. EIGHT PHENYL, TWO PHENYL AND THREE BIPHENYLYL, OR FOUR BIPHENYLYL SUBSTITUTIONS ON ALKANES, C_nH_{2n-62}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Diphenyl-1,2,2-tri-*p*-biphenylylethane 				
227-230 (in N_2)[1]				
1,1,1-Tri-*p*-biphenylyl-2,2-diphenylethane 				
164-167 (in N_2)[1]				

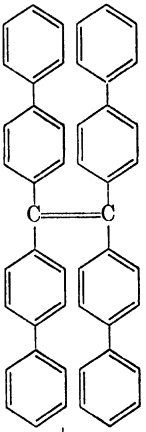
M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,2,2-Tetrabiphenylylethane 				
276–279 [5,6]				
4,4′-Di-(4‴-benzyl-*p*-biphenylyl)-biphenyl 				
239–240 [2]				
$C_{52}H_{42}$ **1,1,4,4-Tetrabiphenylylbutane** 				
236 [4] 234–235 [7]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2,5,5-Tetramethyl-3,3,4,4-tetrabiphenylylhexane 				
136–137[8]				

References on Eight Phenyl, Two Phenyl and Three Biphenylyl, or Four Biphenylyl Substitutions on Alkanes

1. Bachmann, W. E., and F. Y. Wiselogle, J. Org. Chem. **1**, 354 1936-1937.
2. Busch, M., and W. Weber, J. prakt. Chem. [2] **146**, 1 1936.
3. Conant, J. B., and R. F. Schultz, J. Am. Chem. Soc. **55**, 2098 1933.
4. Schlenk, W., and E. Bergmann, Ann. **463**, 1 1928.
5. Schlenk, W., J. Renning, and G. Racky, Ber. **44**, 1178 1911.
6. Wittig, G., and H. Kosak, Ann. **529**, 167 1937.
7. Wittig, G., and F. von Lupin, Ber. **61**, 1627 1928.

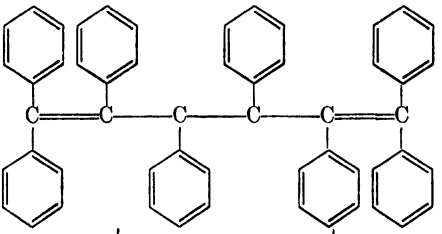
3. FOUR BIPHENYLYL SUBSTITUTIONS ON ALKENES, C_nH_{2n-64}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,2,2-Tetrabiphenylylethene 				
330[1]				

References on Four Biphenylyl Substitutions on Alkenes

1. Schlenk, W., J. Renning, and G. Racky, Ber. **44**, 1178 1911.

4. EIGHT PHENYL SUBSTITUTIONS ON ALKADIENES, C_nH_{2n-66}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,2,3,4,5,6,6-Octaphenylhexadiene-1,5 				
255[1]				

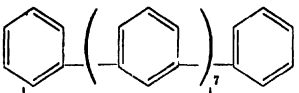
References on Eight Phenyl Substitutions on Alkadienes

1. Bergmann, E., and H. Weiss, Ber. **64**, 1485 1931.

XXIII. COMPOUNDS CONTAINING NINE PHENYL GROUPS

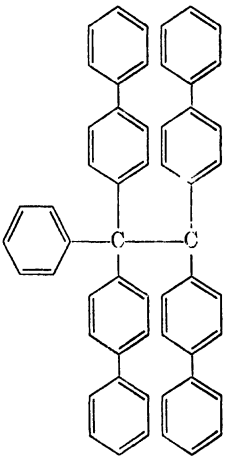
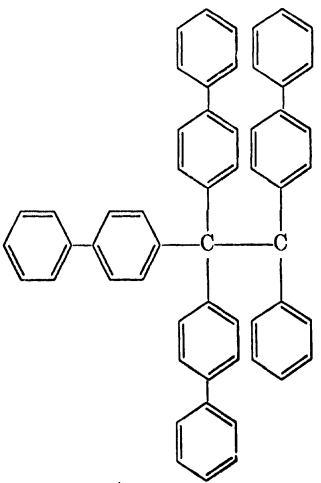
1. Nonaphenyl C_nH_{2n-70}
2. One Phenyl and Four Biphenylyl Substitutions on Alkanes C_nH_{2n-70}

1. NONAPHENYL, C_nH_{2n-70}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
***m*-Nonaphenyl** 				
166[1]				

References on Nonaphenyl

1. Busch, M., and W. Weber, J. prakt. Chem. [2] **146**, 1 1936.

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Phenyl-1,1,2,2-tetra-*p*-biphenylylethane 				
222–228 (in N_2)[1]				
1,1,1,2-Tetra-*p*-biphenylyl-2-phenylethane 				
223–226 (in N_2)[1]				

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Di-(di-*p*-biphenylylmethyl)-benzene				
338–341(a) [2]				

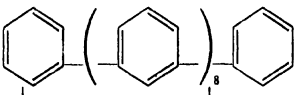
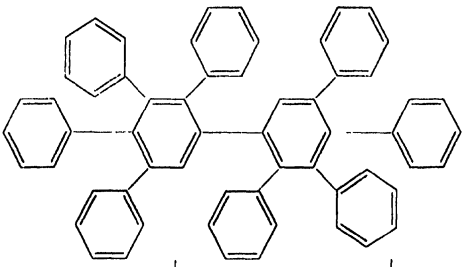
(a) This compound decomposes at the melting point.

References on One Phenyl and Four Biphenylyl Substitutions on Alkanes

1. Bachmann, W. E., and F. Y. Wiselogle, J. Org. Chem. 1, 354 1936-1937.
2. Wittig, G., and H. Kröhne, Ann. 529, 142 1937.

XXIV. COMPOUNDS CONTAINING TEN PHENYL GROUPS

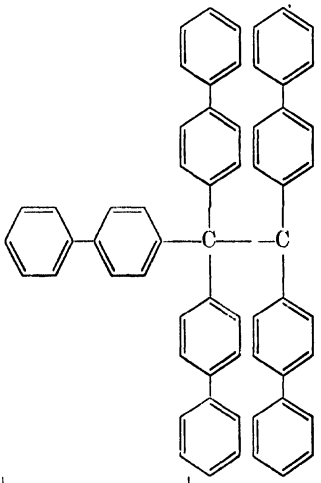
1. Decaphenyls C_nH_{2n-78}
2. Five Biphenylyl Substitutions on Alkanes C_nH_{3n-78}
3. Ten Phenyl Substitutions on Alkahexaenes C_nH_{2n-96}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
***m*-Decaphenyl** 				
184[1]				
2,2′,3,3′,4,4′,5,5′-Octaphenylbiphenyl 				
318–319[2]				

References on Decaphenyls

1. Busch, M., and W. Weber, J. prakt. Chem. [2] **146**, 1 1936.
2. Dilthey, W., W. Schommer, W. Höschen, and H. Dietrichs, Ber. **68**, 1159 1935.

2. FIVE BIPHENYLYL SUBSTITUTIONS ON ALKANES, C_nH_{2n-78}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,1,2,2-Penta-*p*-biphenylylethane 				
226–234 (in N_2)[1]				

References on Five Biphenylyl Substitutions on Alkanes

1. Bachmann, W. E., and F. Y. Wiselogle, J. Org. Chem. 1, 354 1936-1937.

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,5,6,10,10-Hexaphenyl-3,8-di-(2′,2′-diphenylethenyl)-decatetraene-1,3,7,9				
180(a)[1]				

(a) Decomposition takes place at 180.

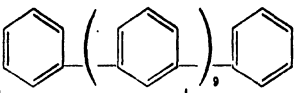
References on Ten Phenyl Substitutions on Alkahexaenes

1. Wittig, G., and H. Kosack, Ann. 529, 167 1937.

XXV. HIGHER PHENYL COMPOUNDS

1. Undecaphenyl C_nH_{2n-86}
2. Duodecaphenyl C_nH_{2n-94}
3. Tridecaphenyl C_nH_{2n-102}
4. Tetradecaphenyl C_nH_{2n-110}
5. Quinquedecaphenyl C_nH_{2n-118}
6. Sexadecaphenyl C_nH_{2n-126}

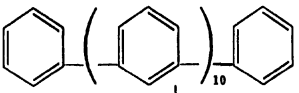
1. UNDECAPHENYL, C_nH_{2n-86}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
***m*-Undecaphenyl** 				
202[1]				

References on Undecaphenyl

1. Busch, M., and W. Weber, J. prakt. Chem. [2] 146, 1 1936.

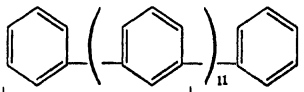
2. DUODECAPHENYL, C_nH_{2n-94}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
m-Duodecaphenyl 				
223[1]				

References on Duodecaphenyl

1. Busch, M., and W. Weber, J. prakt. Chem. [2] **146**, 1 1936.

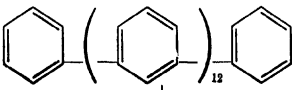
3. TRIDECAPHENYL, C_nH_{2n-102}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
m-Tridecaphenyl				
245[1]				

References on Tridecaphenyl

1. Busch. M., and W. Weber, J. prakt. Chem. [2] 146, 1, 1936.

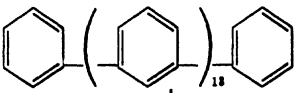
4. TETRADECAPHENYL, C_nH_{2n-110}

M. P., °C	B. P., °C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
m-Tetradecaphenyl 				
270–271[1]				

References on Tetradecaphenyl

1. Busch, M., and W. Weber, J. prakt. Chem. [2] **146**, 1 1936.

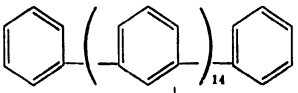
5. QUINQUEDECAPHENYL, C_nH_{2n-118}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
m-Quinquedecaphenyl 				
292[1]				

References on Quinquedecaphenyl

1. Busch, M., and W. Weber, J. prakt. Chem. [2] 146, 1 1936.

6. SEXADECAPHENYL, C_nH_{2n-126}

M. P., °C	B. P.,°C @ 760mm	D_4^{20}	n_D^{20}	Additional Data
***m*-Sexadecaphenyl** 				
321[1]				

References on Sexadecaphenyl

1. Busch, M., and W. Weber, J. prakt. Chem. [2] 146, 1 1936.

CHAPTER IX.

Loyalty to Government.

Royal Visit.—I was invited by the First Assistant to the Honourable the Resident on the occasion of the unveiling of Her Majesty the Queen's Statue at 4-30 P.M. on the 5th February 1906 during the Royal Visit.

The Jubilee in 1908.—The following letter No. G. 3375 Gnl. 163-08-21, dated 2nd October 1908 from the Secretary to the Government of Mysore, General and Revenue Departments to the Deputy Commissioner of Bangalore District, will bear testimony to the loyalty of my family to the British Government :—

"Chennapatna Mohammadans fed the poor in honour of the Day and offered prayers for His Majesty and His Highness' long life and prosperity and Mosque illuminated."—In forwarding the telegram dated 3rd November 1908 from Sowcar Mohammad Mustan Sahib of Chennapatna to the Honourable the Resident in Mysore, I am directed to request that you will be so good as to communicate to the Sowcar